Electrical Review

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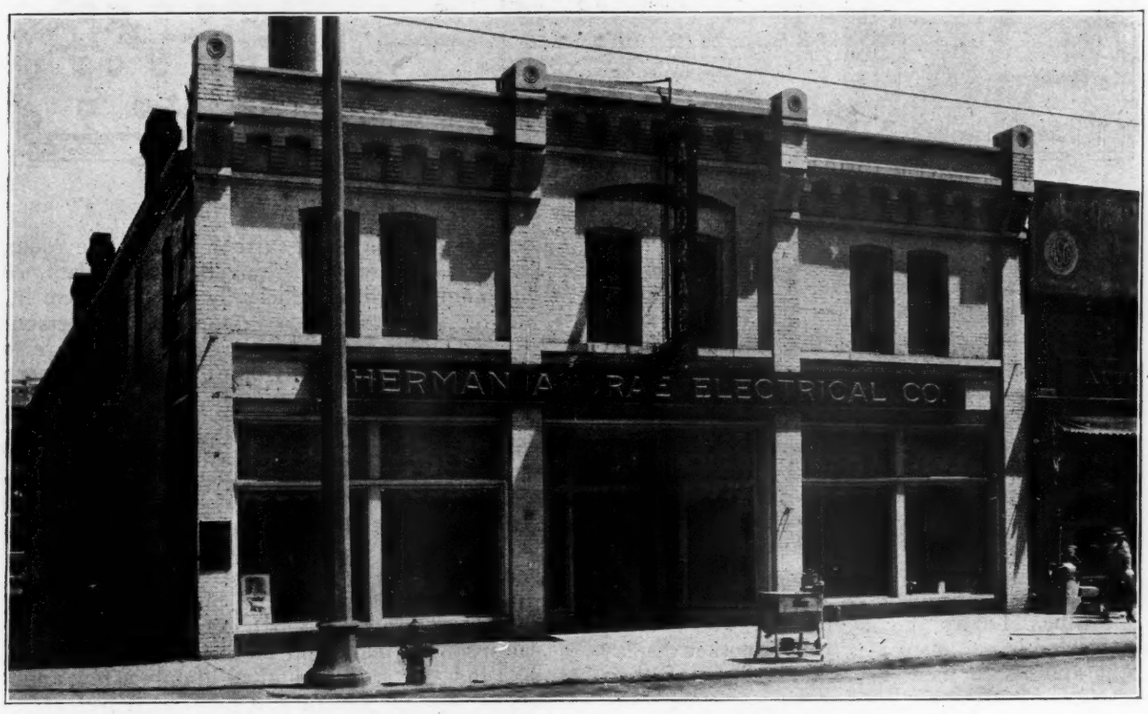


Front View of Building of Herman Andrae Electrical Co., Milwaukee.

Meeting Modern Merchandising Conditions

Milwaukee Contractor-Dealer Sees Unusually Great Future for Electrical Appliance Business and Develops His Organization and Merchandising Facilities to Measure Up to Its Demands

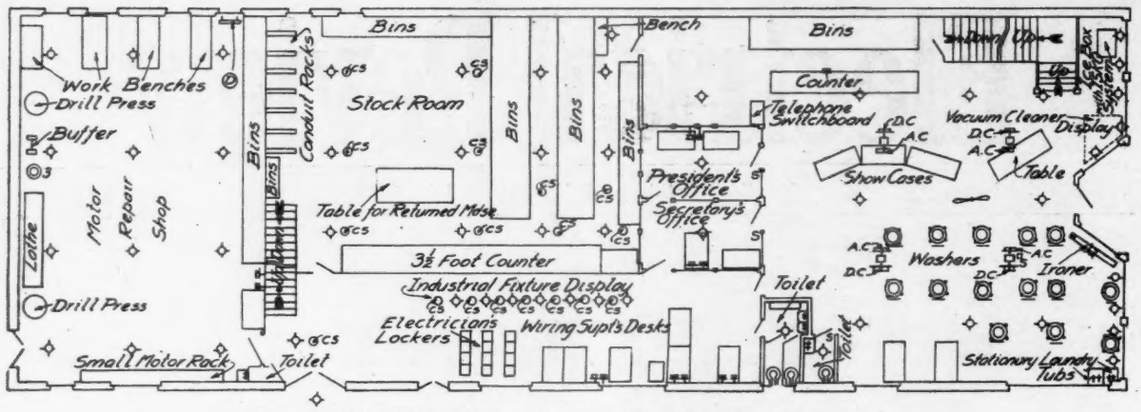
By WILLIAM B. EASTWOOD

"Because the development of the contractor-dealer business appears to us to be the most important feature of the electrical industry today, due to the rapidly growing demand for household appliances and better lighting fixtures, we have sought to create a modern establishment that would measure up to modern conditions. The march of progress in electricity has without doubt shaped a destiny for the contractor-dealer fully equal if not superior to other lines of merchandising."

Thus did Paul C. Burrill, secretary of the Herman Andrae Electrical Co., Milwaukee, justify the opening recently of one of the largest contractor-dealer stores in the country. Every detail of this big electrical store and workshop discloses careful planning and faithful execution of design for efficiency and economy in merchandising and shop work without sacrifice of taste in arrangement and general appeal to the public.

The Andrae store occupies a two-story brick building with a 50-ft. front and a depth of 150 ft., in the rear of which is a 50-ft. space for parking the 14 automobiles operated by the company. Contrary to the usual arrangement of an electrical store, there are no window displays. Instead, the large expanse of front window discloses practically the entire display floor so that people who pass can easily look over the array of appliances occupying the greater part of the main salesroom. This scheme is usually followed in automobile salesrooms. Concealed lamps illuminate the display room at night, being operated by a time clock which turns off the lights after the cessation of traffic.

"What in your opinion are the advantages to



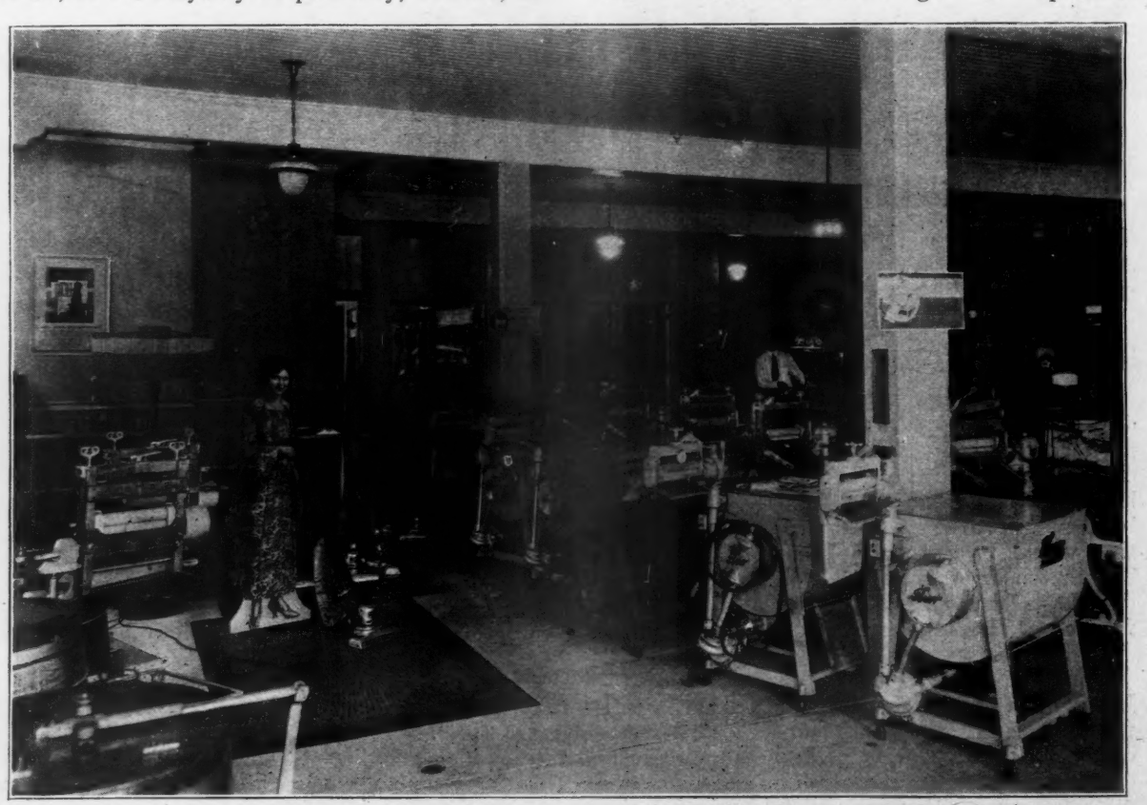
Plan of Main Floor, Herman Andrae Electrical Co., Milwaukee.

be gained by eliminating window displays in favor of the open salesroom display?" was asked of Mr. Burrill.

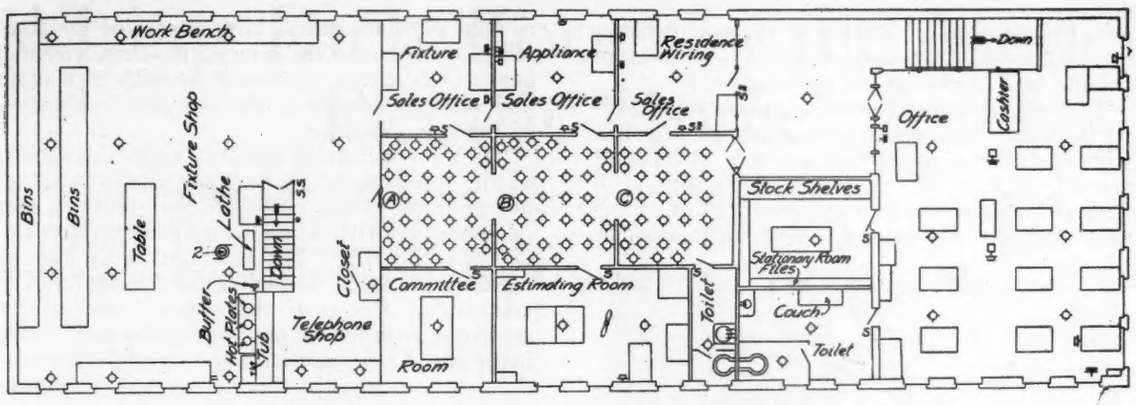
"We want all the daylight we can get, for one thing," said Mr. Burrill. "We believe daylight sells good appliances better than artificial light—and it's more economical. But that is not of such great importance as the matter of the display itself. One must of necessity limit the display in an inclosed window to the specializing of one article or type of goods, or to the few appliances that will present a neat and not too crowded appearance. Those articles in the inclosed window display seldom appeal to more than a small percentage of the passing public at one time. Later, of course, those who are not interested in one display will find another display that appeals to them or reminds them of their needs.

"With the open salesroom display we appeal to all, or the majority of passersby, because, in looking to see what is farther back in the room, they usually find something that they want, or that interests them sufficiently to bring them inside the store for a closer observation or demonstration. Our appliances, large and small, are so arranged that practically all of them may be seen from the front window, yet each appliance is given plenty of space for the customer to see it from every side and watch it in operation during a demonstration. One or more of the washers and other appliances that lend themselves to continuous motion are always kept in operation. These may be seen from the window and many people come inside for a nearer view.

"Another feature is the night display. The concealed lights illuminate every article in the salesroom at night and no one gains the impression that our stock is limited to only a few appliances. On the contrary, it looks as if we carried every kind and pattern of electrical appliance that is made. It seems to give the impression



View of Left-Hand Side of Sales Floor in Andrae Electrical Store.



Plan of Second Floor, Herman Andrae Electrical Co., Milwaukee.

that we can supply every electrical want, and that's what we aim to do."

Lighting Fixture Department and General Offices on Second Floor.

The Andrae store occupies two floors. A broad, open stairway near the front leads to the second floor. Customers who wish lighting fixtures are taken up this stairway and into a series of three display rooms containing the fixtures of many types and designs. The fixtures, each of which is wired for lighting, are suspended from the ceiling. In one of the rooms is also a table on which are displayed boudoir lamps, in another room is a table on which are displayed table lamps, and in the third room there are floor lamps on display. Bowls are displayed on shelves around one of the rooms, wired for illumination. There are more than 100 fixtures and portable lamps on display.

Much space is given to the general offices because of the large amount of business being done by the company. These offices occupy the front portion of the second floor, being separated from the fixture rooms by a rest room, stationery stockroom and a large reception hall. On one side of the fixture rooms, and immediately in the rear of the reception hall, are the offices of department managers; first the residence wiring sales office, then the appliance sales office, and then the fixture sales office. On the opposite side of the fixture display rooms are, first, the estimating room, and back of that the committee room. The rear of the second floor is given over to the shop for assembling and repairing of fixtures, except for the telephone shop in one corner where is carried equipment for intercommunicating telephone systems.

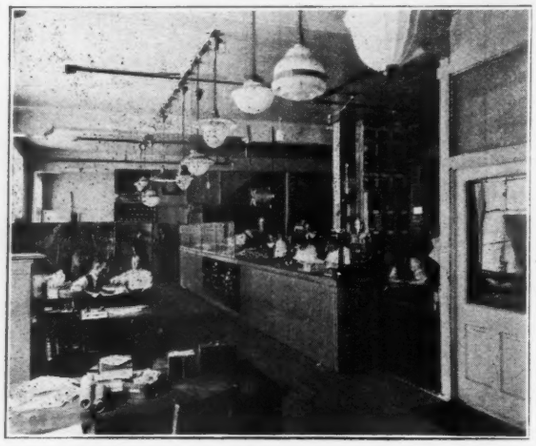
Much Space Given Wiring Department and Motor Repair Shop.

Estimating by the Herman Andrae Electrical Co. is done by a staff of electrical engineers in a most careful and systematic manner. Nothing is

View of Right-Hand Side of Sales Floor in Andrae Electrical Store.

left to guesswork. No item is too small to escape consideration, and no project is too large for the resourcefulness of the engineers.

The many summer resorts in proximity to Milwaukee that have recently been placed in touch with central-station circuits are now furnishing a good field for the electrical contractor. The Andrae company is sharing liberally in this business, several of the resorts having kept a number



Wiring Department and Stockroom, Main Floor of Herman Andrae Electrical Co.

of the Andrae wiring crews busy this summer. To meet this demand the company maintains a fleet of 14 automobiles which are used for conveying electrical supplies, men and equipment.

One of the largest departments of the Andrae company is the wiring department. This department occupies a large space on the main floor along the left side of the building and directly in the rear of the main salesroom. Here the superintendents of the wiring crews have their individual desks, and the electricians have their lockers. The stockroom adjoining the wiring department occupies nearly one-fourth of the main floor. In the stockroom everything has its proper place and order and neatness rule. An excellent display of industrial fixtures occupies space in the wiring department.

Industrial motor repair work is a large item in the business of the Andrae company, the large and well-equipped shop for which occupies the rear of the main floor. In this department are facilities for repairing and rewinding motors from the small sew-motor to the large industrial types. For purpose of operating the various lathes, buffers, drill presses and other machines in the repair departments there is one 3-hp., d-c. motor driving one 2-kv-a., 60-cycle, single-phase generator; and one 15-hp., d-c. motor driving a 10-kv-a., 60-cycle, single-phase generator.

Intimate Supervision Results in Efficient Co-ordination.

"We have one of the most efficient organizations here that it is possible to obtain," said Secretary Burrill as he sat in his glass-paneled office adjoining that of the president, both of which occupy a space near the center of the main floor. From these offices the president and secretary command a clear view of the entire sales floor, the wiring department, stockroom and a portion of the motor repair department. To Mr. Burrill, as well as to the other chief officers of the company, the manner in which the employes and heads of departments co-operate with each other and with the officers of the company is a source of much gratification.

"This co-ordination not only spells the success of the company but it radiates wherever we go in our work, giving customers and others a sort of confidence that wins more business," continued Mr. Burrill. "We treat our men like we would wish to be treated in their place, and in return they feel as if they were a part of the company, with their money as well as their honor invested. The result is honest, capable work on the job and pride in themselves and their company out of working hours."

The company was strengthened recently by making George H. J. Andrae assistant to the president. Mr. Andrae had equipped himself at the University of Wisconsin, and by an engineering apprentice course with the Westinghouse Electric & Manufacturing Co. before the war. He went to France with the engineering corps and upon his return he became industrial heating specialist for the Westinghouse in New England. When the new Andrae store was opened in Milwaukee it was decided that George Andrae was necessary to the success of the wider business venture.

From the basement storeroom to the roof the Andrae establishment is wired for lighting just as the company would wire the building of a client if requested to bring about the best illumination possible. A study of the floor plans of the Andrae building will disclose the position of the outlets. Another feature of the store is an intercommunicating telephone system in addition to the public telephone installation. This convenience is said to save many steps and much time for the officers and employes.

Herman Andrae is one of the pioneers in the electrical appliance business which, of course, is all very modern. But the Herman Andrae Elec-

Motor Repair Shop, Main Floor of Herman Andrae Electrical Co.

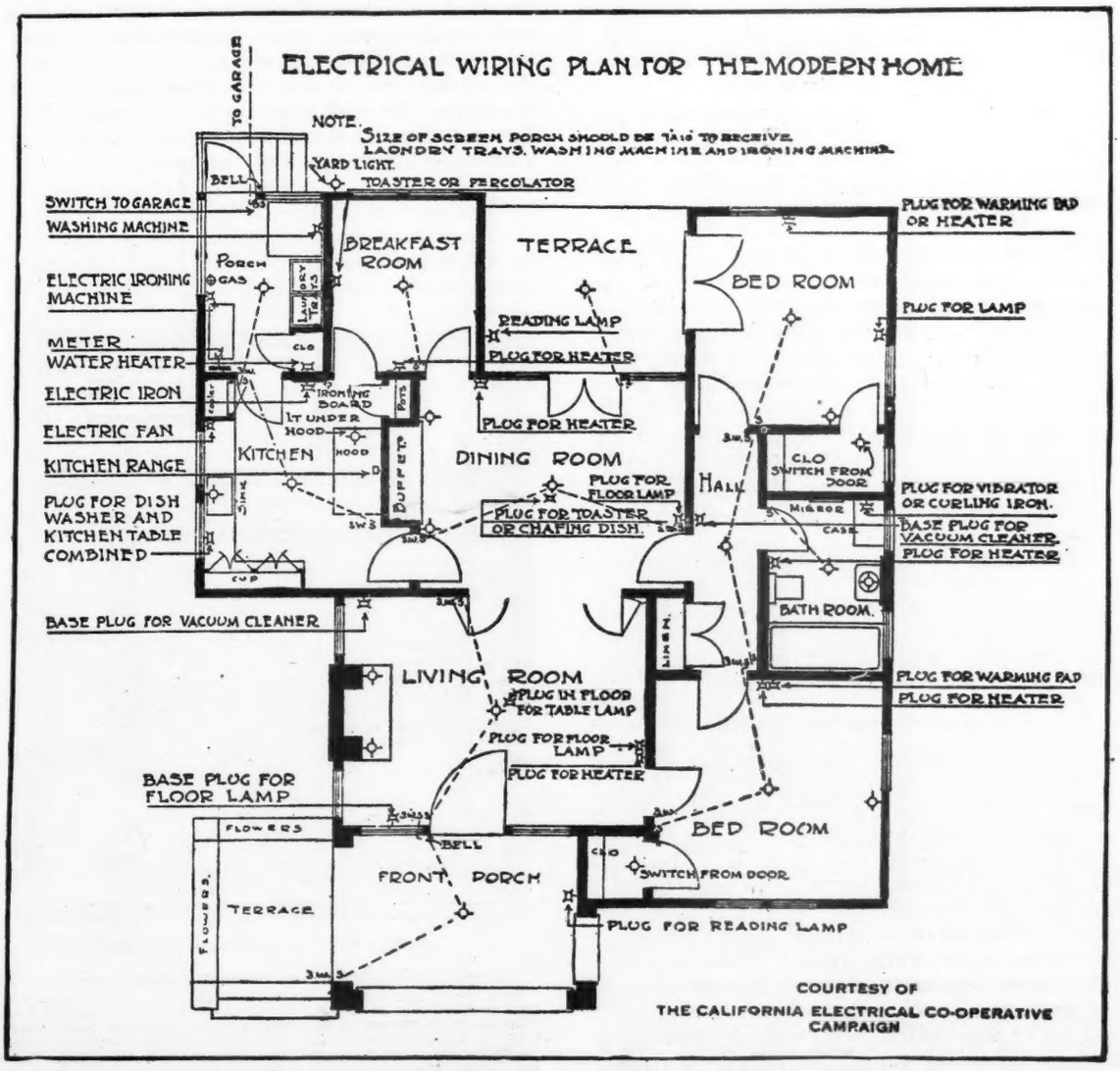
trical Co. is now prepared to do things on a little larger scale than the majority of contractor-dealers in the United States because the officials of the company have the courage of their convictions, and those convictions point to the present time as the coming of the contractor-dealer into his own.

Wiring Each Room in the Model Electric Home

Booklet Issued by National Electric Light Association, and Now Being Distributed Through Contractor-Dealers, Presents to the Home Owners a Convincing Argument for Electrical Efficiency

When the National Electric Light Association compiled and issued the booklet entitled "The Model Home," a signal service was performed for the contractor-dealers of the United States. These booklets are now in the hands of many of them for distribution to their old and prospective customers. The California Electrical Co-operative Campaign is taking care of the distribution in that state as part of its program for better electrical service in the home, the Southern California Association of Electrical Contractors and Dealers having taken 15,000 for distribution. The booklet carries a sales message so direct and concise that its appeal to the public should greatly increase the business of the contractor-dealer, and through him the entire electrical industry.

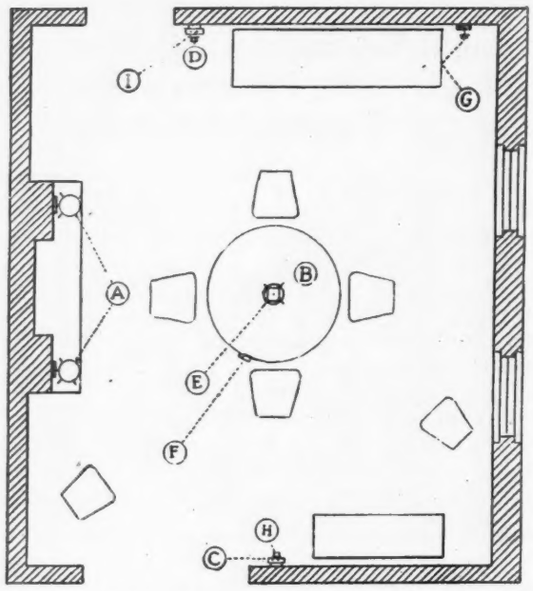
There is nothing elaborate, ambiguous or baffllingly technical about the booklet. On the contrary, it is as simple as a child's primer—with the kind of simplicity that supplies in plain language just the kind of information the ordinary householder desires concerning the problem of electricity in its application to home conveniences. It contains only 16 pages and cover, 5.5 by 7 ins. in size, and more than half of that space is taken up with illustrations and designs showing sug-


ELECTRICAL WIRING PLAN FOR THE MODERN HOME
TO GARAGE
NOTE. SIZE OF SCREEN PORCH SHOULD BE 7'x10' TO RECEIVE LAUNDRY TRAYS, WASHING MACHINE AND IRONING MACHINE.
YARD LIGHT
BELL
TOASTER OR PERCOLATOR
SWITCH TO GARAGE
WASHING MACHINE
ELECTRIC IRONING MACHINE
METER
WATER HEATER
ELECTRIC IRON
ELECTRIC FAN
KITCHEN RANGE
PLUG FOR DISH WASHER AND KITCHEN TABLE COMBINED
BASE PLUG FOR VACUUM CLEANER
BASE PLUG FOR FLOOR LAMP
PLUG FOR WARMING PAD OR HEATER
PLUG FOR LAMP
PLUG FOR VIBRATOR OR CURLING IRON.
BASE PLUG FOR VACUUM CLEANER.
PLUG FOR HEATER
PLUG FOR READING LAMP
COURTESY OF THE CALIFORNIA ELECTRICAL CO-OPERATIVE CAMPAIGN

Electric Wiring Plan for Modern Home, Distributed by Los Angeles Bureau of Power and Light, Department of Public Service, in Co-operation With the California Electrical Co-operative Campaign.

gested wiring plans and locations of convenience outlets. Each illustration and diagram tells a clear story that needs few words to embellish

In order that the matter of proper wiring of the home shall be presented as simply as possible,



Wiring Plan for Dining Room.

NOTE.—Outlets for buffet lamps or bracket lights (A). Ceiling fixture (B). Wall switches for controlling lights (C and D). Outlet in floor under table for attaching table appliances (E). Connection plate on side of table for same purpose (F). Extra outlet in baseboard for fan or radiator (G). Baseboard outlet for vacuum cleaner (H). Wall outlet for cooking appliances on buffet (I).

the booklet presents each room in a model home separately. It shows first an illustration of the room as it would appear finished and furnished with appropriate electrical appliances and lighting. Opposite each illustration is the wiring plan for that particular room, accompanied by a description telling the use of each outlet in connection with the lights and appliances designed for the room. In this manner there are designated the method of wiring and fitting with conveniences the dining room, living room, bedroom, kitchen and laundry.

Two pages of the booklet are devoted to a simple but earnest message to the home owner or housekeeper setting forth the economic and social advantages of the modern electric home. The final page in the booklet gives some pertinent advice on the saving of electricity.

Electric Service in the Dining Room.

An ideal arrangement for electric service in the dining room, as set forth in "The Modern Home," suggests that the outlets for lights should be placed, as designated in the plan, on the side wall and in the ceiling over the table. The lights are controlled by two switches, one near the main entrance and the other near the pantry or kitchen door. Either of these switches should control all the lights in the dining room. There is a floor outlet under the table to permit the use of cooking appliances, such as percolator, toaster, grill, egg boiler and chafing dish, without reaching up and disconnecting one of the lights. A connection plate may be placed on the side of the table for further convenience if desired.

Extra outlets are provided in the baseboard, one near the window for connecting the electric fan, one near the entrance where the vacum cleaner may be easily attached, and another near the buffet for attaching cooking appliances on the buffet. Even though all of these outlets may not be needed in the ordinary dining room now, it is suggested that there is sure to be a future use for them, and their installation while the house is being wired or rewired will obviate the necessity of extra work and extra expense later.

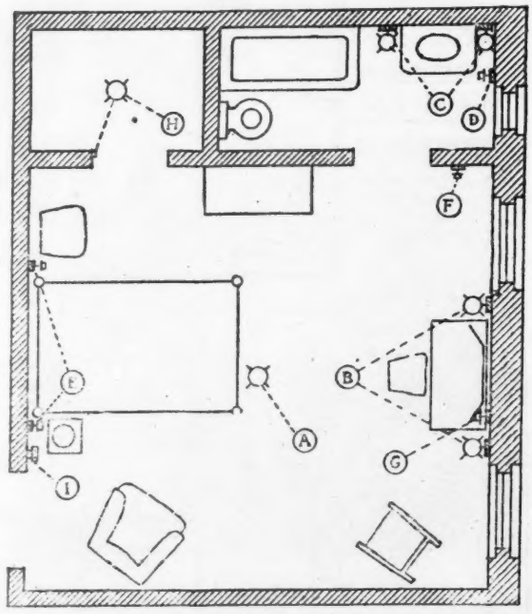
Making the Living Room Attractive.

The plan for wiring the living room, where the greater portion of the day and evening is spent by those at home, provides everything necessary to make it as attractive and comfortable as one could wish. An outlet in the center of the floor provides a ready connection for the reading lamp and a table lamp or sewing machine. This eliminates the use of long cords to the side walls or of running the cords up to the fixture above.

With a double outlet in the baseboard where the piano lamp or player piano remains attached, an extra connection is always available for the electric fan, vacuum cleaner or phonograph. Wall brackets on either side of the windows at both ends of the room provide an artistic and practical lighting effect. Additional wall outlets near the fireplace permit the use of candelabra on the mantel, or for wall brackets if so desired. The lights are controlled by a switch placed convenient to the entrance of the room.

Bedroom and Bath.

Cheerfulness and comfort are greatly increased by ample provision for electricity in the bedroom and bath. As designated in the booklet, the out-



Wiring Plan for Bedroom and Bath.

NOTE—Outlet for ceiling fixture (A). Brackets on wall on either side of dressing table (B). Wall brackets on either side of mirror in bath room (C). Outlet near basin in bath room for radiator, vibrator or hair dryer (D). Outlets on either side of bed for reading lamp, milk warmer or heating pad (E). Outlet near bath room door for electric fan or radiator (F). Outlet near dressing table for curling iron, drying comb or vibrator (G). Light in wardrobe automatically controlled by opening and closing of door (H). Switch near entrance (I).

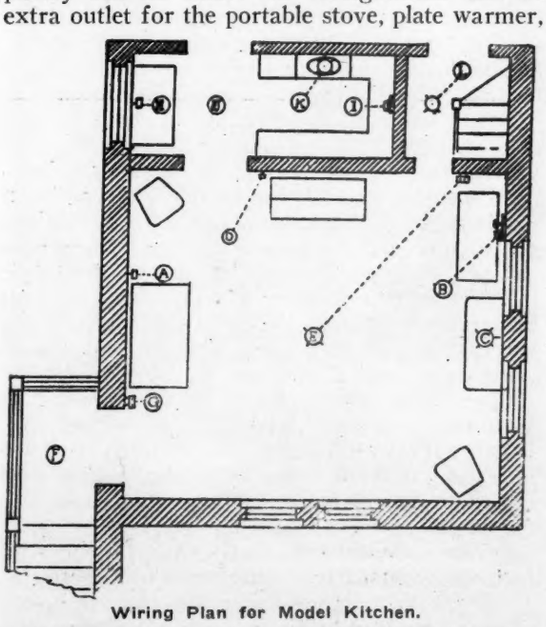
lets in the ceiling and side wall allow plenty of lights in the places where they are always needed for dressing in the greatest comfort. The brackets on either side of the mirror in the bathroom will be found indispensable after they are once used. There is an outlet provided near the basin which permits the convenient use of a radiator, vibrator or hair dryer.

In the bedroom two outlets are placed near the bed for connecting the reading lamp, milk warmer or heating pad. Another outlet is located near the bathroom door for an electric fan or radiator. A wall outlet near the dressing table is convenient for the quick use of the curling iron, drying comb or vibrator. A light is provided for the wardrobe, which is operated automatically with the opening and closing of the door. The lights are controlled from a switch near the entrance. The main bedroom is provided with a master switch which controls the lights throughout the house.

An Electric Servant in the Kitchen.

"Time and effort are reduced to a minimum in a well-planned kitchen," says the booklet. There is an electric cooking range permanently connected to an outlet at the baseboard. A double outlet is placed near the sink for the dishwasher, which may be permanently attached, and for connecting the utility motor, coffee grinder, ice cream freezer, cake mixer, etc. An additional outlet is installed on the opposite wall at a convenient height to avoid bending when attaching the fan or other appliances.

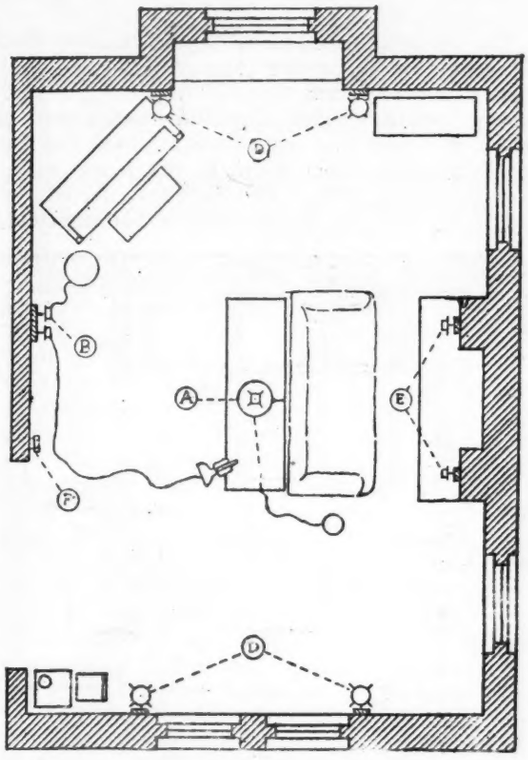
There is a lighting bracket on the wall between the windows to throw the light directly on the sink and dishwasher, while general illumination is provided by the ceiling fixture in the center of the room. A light is installed on the back porch and operated from a switch inside the door. The pantry has an outlet for refrigeration and an extra outlet for the portable stove, plate warmer, drink mixer, etc. A ceiling light and a bracket lamp afford ample illumination for the pantry.



Wiring Plan for Model Kitchen.

NOTE.—Outlet for electric range (A). Double outlet near sink for dish washer and utility motor (B). Lighting bracket between windows (C). Extra outlet in wall for attaching electric fan or other appliances (D). Ceiling fixture (E). Light on back porch (F), controlled by switch (G). Outlet in pantry for refrigeration (H), and extra outlet for portable stove, plate warmer, drink mixer, etc. (I). Ceiling light in pantry (J), and bracket light (K). Ceiling light for rear stairs (L).

In the laundry, which is frequently found in the basement of the home, the first requisite is the electric washer and wringer combined in one machine. The outlet for the washer is placed near the stationary tubs. It is becoming the habit to install in the laundry a drying room for rainy or wintry days. In this room an outlet is provided for an electric fan, or a double outlet may be installed where an electric radiator is used in connection with the fan for drying the clothes.



Wiring Plan for Living Room.

NOTE.—Outlet in center of floor for reading or table lamp (A). Double outlet in baseboard for piano lamp or player piano and for electric fan, vacuum cleaner or phonograph (B). Wall brackets on either side of windows at both ends of room (D). Wall outlet for bracket or candelabra on mantel (E). Wall switch near entrance (F).

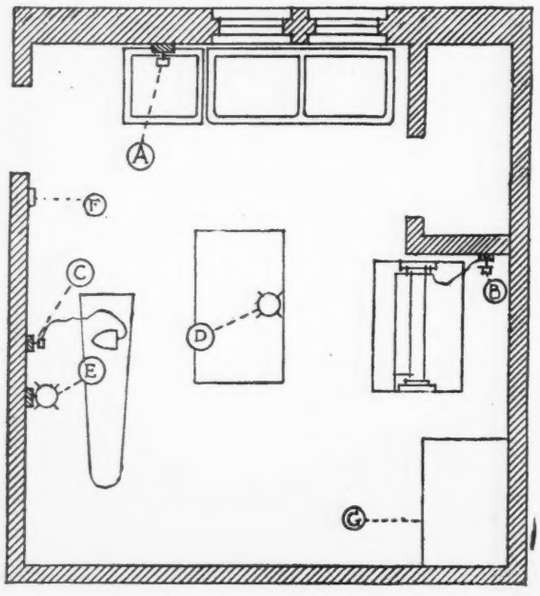
Electric service in the laundry minimizes the greatest task of all the home work. For that reason the housekeeper should be induced to have the laundry as fully equipped as possible. The electric ironer, or mangle, saves a great deal of time and energy in the ironing of all flat work. For the ironer an outlet may be installed in one of the walls of the laundry, near the drying room. On the opposite side, convenient to the ironing board, an outlet is installed in the wall for the attachment of the electric flatiron. The room is evenly lighted from a drop light near the center, while a bracket lamp should be placed directly above the ironing board.

Progress in the California Campaign.

Missionary work of the National Electric Light Association booklet will be considerably augmented in and around Los Angeles when a model electric home, similar to those in San Francisco and Oakland, Cal., is thrown open to

the public in September. This model home, like those in the other two cities, is part of the program of the California Electrical Co-operative Campaign. It affords the public an opportunity to see an actual demonstration of the value of convenience outlets and the various electrical appliances which may now be had for equipping the modern home.

The Department of Public Service of Los Angeles is lending strong support to the electrical campaign. A recent bulletin of the light and power bureau of this department contained a tentative wiring plan for a modern home, the use to which each outlet might be put being incorporated in the plan. The bulletin advised the public to "wire the house complete for sufficient,



Wiring Plan for Laundry.

NOTE.—Outlet near tubs for washer (A). Outlet for ironing machine (B). Outlet for electric flatiron (C). Drop light in center of room (D). Wall bracket above ironing board (E). Switch for controlling lights (F). Electric clothes dryer (G).

convenient and decorative illumination, as well as for the use of modern labor-saving appliances."

One of the features of the model home plan presented by the Los Angeles Department of Public Service is a screened porch in the rear fully wired for laundry appliances, including a water heater and ironing machine. There are also two terraces, one front and one rear, with outlets designated for lights, and any other convenience appliances.

In addition to its many other electrical activities the advisory committee of the campaign has undertaken educational work on industrial lighting. This work is built up around two exhibits, one in San Francisco and one in Los Angeles, both modeled after the industrial lighting exhibit shown in Pasadena during the last convention of the National Electric Light Association. Competent men are in charge of the two exhibits and occasional lectures on industrial lighting are given. The combining of industrial lighting with residential wiring in the campaign at this time serves to greatly increase the stimulus of the electrical idea in that state. And the effects of the California campaign are being beneficially extended throughout the entire country.

PLAN CHEMISTRY AID TO INCREASE INDUSTRIAL PRODUCTION.

Increased production through chemistry is to be the keynote of the reconstruction convention of the American Chemical Society to be held in Chicago, Sept. 6-10. The convention will be under the auspices of the Chicago Section of the society, working in co-operation with the Chicago Association of Commerce.

The council of the society will be the guests of the Chicago Chemical Club, Monday noon, Sept. 6, and following its afternoon session will be entertained at dinner by the Chicago Section. The general meeting of the society will be held Tuesday morning at the Congress Hotel, which is the official headquarters. It will be continued Tuesday afternoon in the Patten gymnasium at Northwestern University. Following the scientific meeting there will be, weather permitting, a unique outdoor smoker on the campus of the university, which borders on Lake Michigan. A band concert, organ recital and outdoor sports will provide the amusement. All meetings of the various divisions and sections at which papers will be read will be held in the buildings of the University of Chicago.

Dr. William A. Noyes, head of the department of chemistry of the University of Illinois, Urbana, Ill., is the president of the society, and Dr. Charles L. Parsons, Washington, D. C., is the secretary. The officers of the Chicago Section include Dr. W. Lee Lewis, chairman, R. J. Quinn, secretary, and E. M. DeBeers, treasurer.

PLANS PROGRESSING FOR COMING I. E. S. CONVENTION.

As has already been announced, the date for the next annual convention of the Illuminating Engineering Society, to be held in Cleveland, originally set for Sept. 27-30, has been changed to Oct. 4-7. The change was made to avoid conflict with the American Legion convention to be held in Cleveland the last week in September.

While the complete program is not yet available, the committee is planning to make this convention carry a popular appeal not only to technical men but to all those in any way interested in illumination. Attendance of jobbers, dealers, contractors, architects, educators and others who can put the better-lighting idea before the public is being solicited. Keen interest in the plans is being displayed and indications point to a big success for the convention, which is expected to bring out a large attendance.

The committee in charge of arrangements is as follows: General convention committee, J. E. North, Cleveland Electric Illuminating Co., chairman; W. M. Skiff, National Lamp Works, vice-chairman; reception committee, G. E. Miller, Cleveland Electric Illuminating Co., chairman; publicity committee, H. S. Greene, National Carbon Co., chairman; entertainment committee, J. M. Smith, Ivanhoe-Regent Works, chairman; finance committee, George S. Milner, Erner Electric Co., chairman; hotel committee, A. M. Collins, Western Electric Co., chairman; attendance committee, G. S. Black, Cleveland Engineering Society, chairman; registration committee, J. L. Wolf, Builders Exchange, chairman.

Retailing Electrical Appliances Through Chain Stores

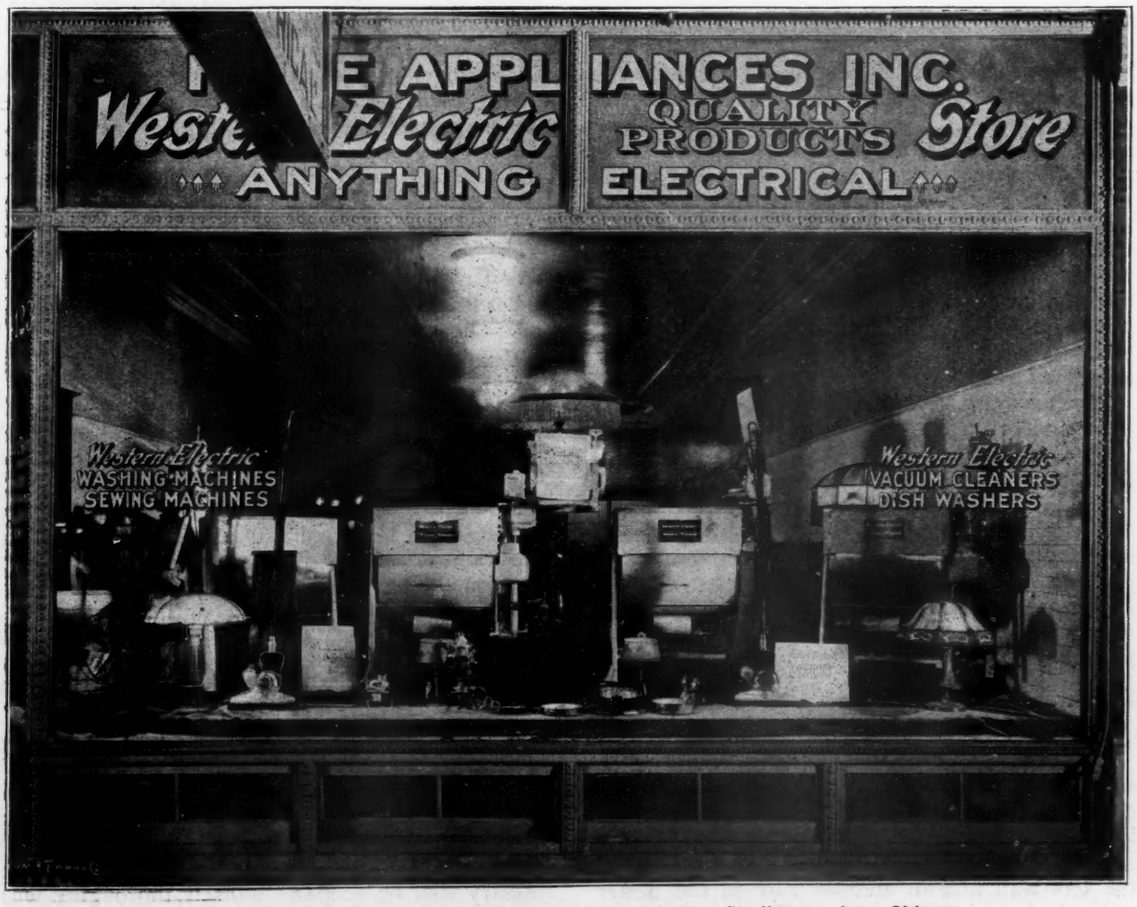
Chicago Company Organizes to Centralize Operation of Chain Stores Devoted Exclusively to the Merchandising of Electrical Household Appliances — Special Training Given to Salesmen

Chain stores dealing exclusively in electrical household appliances are following in the wake of cigar, grocery and other kinds of chain stores. One of the recent organizations in the electrical field is the Home Appliances, Inc., of Chicago. This company opened its first store about a year ago. Since that time it has opened two more stores in Chicago and is preparing to open three more in the next month or two. Later it is intended that the chain will include stores in Joliet, Elgin and other cities in Illinois and adjoining states.

The stores of this company specialize in the retailing of electrical appliances for the home. They will handle no wiring contracts. While the company will deal exclusively in Western Electric products, it has no connection with the Western Electric Co. other than a contractural one covering the supplying of merchandise, according to the officers of the retail company.

Salesmanship is the chief consideration governing the management of this chain of stores. But it is salesmanship in the broadest sense of the term. It involves a careful study in window displays and the arrangement of the merchandise within the stores in the most attractive manner possible. There is a competent manager in charge of each store. There is also a cashier and as many salesmen as the business of each store warrants. Each individual receives special training for his or her post at the hands of the officials of the company. The person whose duty it is to dress the show window must study the value and appeal of each appliance when placed in the most attractive manner in a demonstration or display. The full value of lighting of the display must also be taken into consideration. There must be no inharmonious note about the finished display when it is disclosed to the street crowds.

One of the best examples of window display arrangement in the stores of the Home Appliances, Inc., may be found at the store at 4123



View of Front of the Madison Street Store of Home Appliances, Inc., Chicago.

Interior of Madison Street Store of Home Appliances, Inc., Chicago.

Madison street, where the window expanse lends itself naturally to a display of large appliances. In this window, a view of which is presented herewith, four electric washing machines form the principal feature. These washers are arranged in a semi-circle with one of the wringers attached and swung to crown the center of the picture presented by the display. A tall floor lamp in the rear of the wringer dresses the scene more completely. On a small dias in the center of the display rests a portable electric sewing machine, flanked by a few small table appliances and portable lamps. Two vacuum cleaners placed upright at equal distances from the center and the ends serve to break what might otherwise be a monotonous level presented by the tops of the washers. A few lamps appropriately placed and two show cards complete the arrangement.

Just as much care is taken in the dressing of the window space in the store at 6530 South Halsted street, where the central street entrance divides the display space into two parts. These spaces are, however, sufficiently large to permit the featuring of an electric washer in each window. Several vacuum cleaners and some well arranged table appliances complete the displays. Extreme neatness and an artistic blending of colors prevail in all the window displays of the company.

Symmetrical Arrangement of Displays on the Sales Floors.

In the arrangement of the sales floors in the stores a certain symmetry is presented by placing the appliances in departments, or arranging each kind in groups by themselves. In the Halsted street store the washers are placed in a row along the left wall and in another row in the center near the rear of the store. On the right are placed the vacuum cleaners and dish washers, while the small appliances and package goods occupy shelves in the rear. In front of the shelves are two glass showcases, and convenient to them is the cash register and office.

Washers predominate in the Madison street store, there being a row on each side as well as in the center. The vacuum cleaners are also placed in groups, one on either side of the room. Small appliances occupy tables at one side in the rear of this store, while on the other side are the package goods, wrapping counter and cash register. The office occupies a small cubical in a rear corner. The floor in this store is of neatly patterned tile, enhancing the artistic arrangement of the salesroom.

Training Salesmen to Specialize in Chain-Store Service.

Much of the effort of the salesmen in this company is devoted to furnishing genuine service to the customer with the appliances sold. These salesmen are trained to realize that many of the people who buy appliances today do not have a full appreciation of the necessity for proper care and application of them. The salesmen must diplomatically impress the customer with the proper knowledge as to electrical application, the economy and safety in proper connections and the turning off of the current as soon as the work of the machine is finished, the oiling of the parts and numberless other little points that will cause the appliance to stay sold after it is in the home.

Since the rendering of this class of service is considered the greatest asset that a salesman can have in an establishment that is devoted exclusively to the sale of electrical appliances, it is necessary that he acquaint himself thoroughly with each article he is called upon to sell. He must

not only know the machine and its operations, but he must know the proper electrical connections, the amount and cost of electricity required to operate it and the knack of imparting all such information correctly and convincingly to the prospective customer.

Since but one make of an appliance is carried in these stores the salesmen are not required to learn the peculiarities of other kinds. In the making of a sale of a washing machine, for instance, the salesman must be prepared to go to the house of a customer and demonstrate its proper use by doing a washing himself. The following week he may be required to go to the house of the same customer and watch, or supervise, a washing done by the customer herself. Perhaps a month later he will visit the house ostensibly to learn how the washer is behaving. In reality he is using the "service" to sell other appliances. Having gained the confidence of the customer he does not find it so difficult to direct her interest in the purchase of a vacuum cleaner or other appliances.

Under the chain store system it is possible, according to the officers of the Home Appliances, Inc., to interest high-priced men in the central office organization. These men are capable of giving efficient training to the men who are selected to manage the stores, to the salesmen and to the bookkeepers and cashiers. They also point to the economy of purchasing their stock in large quantities and centralizing the bulk of the accounting and advertising.

SPECIAL POST-GRADUATE TRAINING FOR TECHNICAL MEN.

Western Electric Co. and Columbia University Complete Arrangements Whereby Technical Students Can Have Full Opportunity for Study.

Arrangements have been completed by the educational authorities of the Western Electric Co. and the faculty of Columbia University to enable employes of the former to carry on post-graduate courses coincident with their regular duties. This system has been limited to the members of the engineering department where more than 3000 technical students are eligible to take advantage of the offer. Approved graduates of colleges and scientific schools may pursue graduate work for masters' degrees and fulfill the requirements in two calendar years, this period being only twice the time required by regular full-time study.

Exterior of Halsted Street Store of Home Appliances, Inc.

The hours of the work in the engineering department of the Western Electric Co. have been especially arranged to provide those who attend the classes at Columbia with full opportunity for study. The salaries of such students are adjusted to the individual circumstances and meet all living and tuition charges. Admission is dependent on an adequate grounding in mathematics and physics. After the candidates are nominated by the officials of their departments they must meet the academic qualifications of the university. Several of the more qualified employes have been permitted to undertake work for a doctorate at Columbia.

Interior of Halsted Street Store of Home Appliances, Inc.

A special course of training in technical work has also been started by the company itself to instruct graduates of arts colleges in its engineering methods. A month is set aside by the educational authorities for ground work and after that activity is started in the laboratories. The entire course takes nine months. Outside reading and lectures are required during that period.

VARIATION OF RESIDUAL INDUCTION AND COERCIVE FORCE.

Bureau of Standards Makes Experimental Proof of Relations Between Magnetizing Force and Flux.

A report of an investigation to ascertain whether or not analytical expressions similar to the reluctivity relationship of Kennelly correctly represent the variation of residual induction and coercive force with the maximum magnetizing force is given in Scientific Paper No. 384, entitled "The Variation of Residual Induction and Coercive Force With Magnetic Force," recently issued by the Bureau of Standards, Washington, D. C. Hysteresis measurements were made on a number of samples covering a wide range of materials using magnetizing forces up to 2500 gausses. The relationships $H_m/B_r = a_1 + b_1 H_m$ and $H_m/H_c = a_2 + b_2 H$ were found to hold within the limits of the probable experimental error.

Factors in Selecting Alternating-Current Motors

Induction and Synchronous Motors Each Have Particular Fields of Application and Have Different Operating Characteristics — Mechanical Features and Manufacturers Reputation Vital Points

It is only within the past few years that the a-c. motor has been developed to a point where satisfactory and economical operation could be counted upon. Now, however, this class of motors has come into general use, and it is the aim of this article to explain some of the considerations that should guide in purchasing at minimum cost motors best suited to the purpose intended. In general it may be said that much the same reasoning applies to a-c. motors that has governed the choice of d-c. motors.

In the choice of phase, single-phase, two-phase or three-phase, the purchaser is usually limited by the power available. Where there is a possibility of selection, the single-phase motor should be selected only after careful consideration of its various characteristics and the service rendered. The first cost is comparatively high, the efficiency and power-factor are apt to be a little low and, in the opinion of many engineers, the single-phase motor is more liable to give trouble than the other types, especially under hard service. Between two-phase and three-phase motors there should be little difference in cost and they have practically the same reliability in operation. The three-phase motor has slightly better characteristics and usually runs cooler under severe operating conditions. Three-phase motors are becoming practically the standard in a-c. work. The two-phase motor, as a rule, requires four wires to be brought from the source of supply against three for the three-phase, this slightly increasing the cost of installation. When lights and motors are to be operated on the same system, the two-phase arrangement has certain slight advantages in regard to the uniformity of the lighting.

Transformers Are Required With Certain Motor Installations.

Generally the voltage also is determined by the source of supply; however, if transformers are to be used, any desired voltage may be obtained. If a high voltage is used for the supply (by that is meant 2200 volts or over) it is quite desirable that motors of 250 hp. or over be wound for that voltage and connected directly to the line. It may be observed, however, that a motor wound for 4400 volts is about 25% larger than one designed for 2200 volts. Great care should be exercised in the installation of high-voltage motors, and no one but an experienced electrician should be allowed to touch the motor or its switches. The insulation of high-voltage motors is, of course, subjected to greater stresses than is the case with lower voltages, and especial care should be taken to protect the machine from moisture.

If a high-voltage installation is considered undesirable, or motors of only moderate size are used, transformers can be installed and 220 or 440-volt motors employed. These have practically the same efficiency and operating characteristics as the high-voltage motor and may be somewhat lower in first cost. When the cost of transformers is taken into consideration, however, the total cost of the installation is materially increased. With motors of comparatively small size, the difficulty of providing proper insulation, both in manufacturing and application, makes the use of a 220 or 440-volt motor practically a necessity.

The frequency for which the motor is designed is also dependent on the source of supply. Frequencies of 25 and 60 cycles are the most common and may be considered standard, although other frequencies are sometimes employed. A frequency of 25 cycles is generally used on long transmission lines, and is desirable for large slow-speed motors. The cost of transformers for 25-cycle service is considerably greater than for 60 cycles. The latter frequency, however, is considered best for general factory purposes, the ordinary sizes of induction motors used being available in a much greater range of speeds at this frequency.

Induction Motors Suitable to Many Services.

In the choice of a-c. motors it will be found that the "squirrel-cage" induction motor will meet the great majority of requirements. This is usually of the open type which is similar to the semi-inclosed d-c. motor as far as mechanical protection is concerned. The motor is so little affected by dust and the moving parts are of such rugged construction that it will operate successfully in most of the locations where an inclosed d-c. motor would be required. Ordinarily, induction motors are not made inclosed, but when one is to be used in a very damp location, or it is desired for any reason, tight covers may be provided for the openings in the motor frame. This will decrease the capacity of the motor except when it is used on a very intermittent service, and the motor should, therefore, be selected with this in mind. To avoid this difficulty an induction motor has been developed which is totally inclosed, but is fitted with fans which draw air from an outside source.

As is the case with the d-c. motor, a saving may sometimes be effected by ordering equipment for intermittent duty. However, the cases are not quite parallel as a d-c. motor of medium size requires from five to eight hours at full load to attain constant temperature, while an induction motor of the same size may require only from two to four hours. When the rating of a motor is increased because of its use on intermittent service, there is no increase in the mo-

mentary load that it can carry or start, except at the sacrifice of power-factor and efficiency as is done for crane ratings.

Speed Variations Are Somewhat Limited.

The speeds available with a-c. motors are somewhat limited, but a high-speed motor should always be cheaper than one for low speed. With a frequency of 60 cycles, speeds of approximately 3600, 1800, 1200, 900, 720, 600 or 514 r.p.m., etc., may be obtained at no load although few motors are built for 3600 r.p.m. The full-load speed is seldom more than 10% below the no-load speed. With 25-cycle motors these speeds are reduced in the ratio of 60 to 25.

The speeds given above are what are commonly known as synchronous speeds, and are never quite attained by induction motors. However, at no load, the difference between synchronous speed and running speed is slight.

The a-c. motor is perfect in regard to reversal of rotation, running equally well in either direction without any adjustment or increase in cost; the external controlling apparatus required for reversing is simple and inexpensive. It is, however, essentially a constant-speed motor, and, with a few exceptions, speed regulation is unattainable.

Guarantees Commonly Made With Induction Motors.

In selling an induction motor the maker will generally guarantee certain values for efficiency, power-factor, slip, starting torque and pull-out torque, the last two being expressed in terms of full-load torque. Clearance may also be given in some cases, and temperature rise is guaranteed in the same manner as for d-c. motors.

The importance of variations in efficiency depends entirely upon the amount and value of the power that will be saved. If a motor is to operate 10 or 24 hours per day, and power is expensive, a small difference in efficiency is worth considering. If the motor is to operate but an hour a day, or if power is very cheap, the efficiency is of little importance.

Full-load power-factor is often of less importance than the efficiency. A motor of low power-factor may have the same efficiency as one of higher power-factor, in which case the former will take a larger current from the line although it consumes no more power than the latter. This will have the effect of increasing the losses in the line and in the generator, but, as these are normally only a small percentage of the total load, they are in most cases negligible insofar as the user of the motor is concerned. The load on the engine will be practically the same in either case and there is little choice between the two. In the case of a large motor, or a group of small ones, on a long transmission line, the power-factor may become of considerable importance. In this case the loss in the line may be quite large, and the addition caused by a low power-factor be of real importance; or the higher current to be carried might require heavier conductors for the line, which would very materially increase the cost. It should also be remembered that an a-c. generator is rated at an output of a given number of amperes, consequently the generator can deliver more power at a high power-factor than at a low power-factor. The same generator would be capable of delivering 80 hp. at 80% power-factor, 90 hp. at 90% power-factor or 100 hp. at 100% power-factor. Regulation of the generator is also better when operating on high power-factor than on low. Since the power-factor of induction motors decreases quite rapidly as the load diminishes, and as few motors run continuously on full load, the power-factor at one-half load is of considerable importance.

Considering all conditions, the motor having a high power-factor is to be chosen where other factors permit. It is often cheaper in the end to buy the better motor and so avoid the paying of extra service charges. In all cases where central-station service is to be used, it is well to consult with the service company and determine what advantages or penalties will result from the use of motors with high or low power-factor.

Torque and Its Importance in Motor Operation.

Starting torque is of comparatively small importance when the motor starts under light load, which is usually the case; there are, however, numerous exceptions such as elevating and conveying machinery, long lines of shafting, machinery with heavy flywheels, and all other cases where a heavy pull is required to start the load. Torque is the pull in pounds exerted at the face of a pulley 2 ft. in diameter, but it is often more convenient to express its value as a multiple of the pull exerted on a pulley of any size when the motor is carrying its full load at normal speed. One and one-half times full-load torque is a figure frequently given for starting torque, this value being satisfactory in most instances. However, a very heavy current will be required for starting when the actual load approaches that figure. If the load is above the specified figure, the motor may not start; if the load has great inertia and so requires a considerable time to be brought up to speed with the specified starting torque, the motor may become very hot before full speed is attained. This difficulty may be overcome by the use of a special motor, one method being to use a squirrel-cage motor with high-resistance end connectors. This will increase the slip and decrease the efficiency of the motor, but, as it adds little to the expense, is quite likely to prove the best method when only a moderate increase of starting torque is desired. When such a rotor is used it is necessary to rate the motor with 20% less capacity than with the ordinary rotor. If this method is not sufficient, or if the increased losses are too great a drawback, a different type of winding should be employed.

The pull-out torque, expressed as a multiple of full-load torque, is the maximum that the motor can exert while running. When the pull-out torque is exceeded the motor will stop quite suddenly, and cannot start again until the load is reduced to the value of the starting torque, which is considerable lower than the pull-out torque. Although the motor will heat very rapidly under a load approaching the value of pull-out torque, it is well to have this value as high as possible in order that the motor may not be brought to a standstill by the momentary application of a heavy load such as might be occasioned by the

throwing of a clutch, shifting a belt or the momentary overloading of a machine tool. From two to three times the full-load torque is commonly specified for pull-out torque.

Heating Is the Limiting Factor in Motor Loading.

The heating of an induction motor is its only limitation as to load-carrying capacity, up to the time that the pull-out value is reached; it can operate on such a load for only a brief period without danger of a complete burn out. Lower loads can be carried for a longer period, and the motor should be able to carry 25% overload without excessive heating. Such an overload capacity should be included in specifications.

The slip, usually expressed as a percentage, is the amount of reduction from synchronous speed that is found when the motor is operating under full load. Like the slip of a belt, it is a direct loss of power. In ordinary practice the slip varies from 3 to 10%, it being customary to consider the motor as running at constant speed for ordinary service.

In spite of the loss in efficiency, a motor with comparatively high slip is desirable for driving certain classes of machinery such as those provided with heavy flywheels or having a reciprocating motion. The variation of speed with load will allow the flywheel to fulfill its function, or the motion of the machine to be reversed, without subjecting the motor to a heavy overload and causing violent fluctuations in the line current and voltage. In some cases it may even prevent the pull-out torque being exceeded. An increase in slip is obtained by providing the rotating part of the motor with a winding of higher resistance than would otherwise be used, which, as previously stated, also increases the starting torque.

Wound Rotor Gives Special Advantages to A-C. Motors.

When an exceedingly heavy starting torque is desired, when the motor is frequently started and stopped under a moderate torque and the heavy fluctuations of current caused thereby are annoying, when a comparatively slow rate of acceleration is desired or where speed regulation is to be obtained by an operator in constant attendance, the squirrel-cage winding on the rotating part of the motor is replaced by an open winding connected to collector rings on the shaft. These rings are connected by brushed and suitable leads to a controller, the operation of which introduces a variable amount of resistance into the circuit formed between the collector rings. Such a machine is known as a "wound-rotor" induction motor.

In the cases previously described the slip and starting torque were increased by permanently increasing the resistance of the rotating element. In the present case the resistance can be varied at the will of the operator, and may therefore be carried to a far higher value in starting than would be permissible if it were to be left permanently in circuit. Although the speed of the motor may be in this way reduced to any desired extent, the operation at low speeds will be very inefficient.

Clearance between stationary and rotating parts is exceedingly small on all induction motors so that a very rigid construction of shaft and bearings is desirable. To increase the clearance would require the loss of other valuable characteristics, but, other things being equal, the motor with the larger clearance is evidently to be desired. The purchaser should be very careful not to be misled by confusing "clearance" with "total air gap." The latter is sometimes given by salesmen without calling attention to the fact that its value is twice the clearance.

Characteristics of Synchronous Motors.

The synchronous motor is seldom used except for large units. It may be constructed to operate equally well on single-phase, two-phase or three-phase circuits, but its general use is limited because of the fact that there must be a supply of direct current to excite its field magnets and that in its simpler forms it is not self-starting. When its fields are properly excited and it has been brought up to speed, current may be thrown on from the main supply at the instant that synchronism is indicated by lamps or by a suitable instrument on the starting panel. Synchronous motors may be brought up to speed in a number of different ways, in the larger installations it being common practice to start the machine with a d-c. motor mounted on the main shaft. However, an a-c. motor of the induction type may be used for starting, and, in many cases, the motor itself is made self starting by the addition of a squirrel-cage winding to the field structure. If the frequency of the supply circuit remains constant, this type of motor will run at absolutely constant speed from no load up to a very heavy overload; when the overload becomes too great the motor will stop suddenly.

Power-Factor Variable With Synchronous Motors.

Although the above distinguishing characteristics may be valuable in some instances, a more important factor is its ability to run at almost any desired power-factor. Varying the strength of the direct current exciting the field magnets, which may readily be done by an attendant while the machine is running, will cause a variation in the power-factor. In this manner the power-factor can not only be raised to 100%, but can be made to neutralize the effect of other apparatus having a lower power-factor.

In order to insure reliability and continuous service under severe working conditions, one must be guided by much the same consideration as in buying d-c. motors or any other kind of electrical or mechanical apparatus. Secure a machine that is heavy enough for the work; do not try to make a 10-hp. motor carry a 20-hp. load. Although mere weight is not a criterion of excellence, from a mechanical standpoint one should be sure that the manufacturer has not gone too far in his efforts to save material. Special attention should be given to see that the bearings are properly constructed and large enough to deliver the service expected of them. Most important of all, buy of a firm with an established reputation, one in whose engineering ability, skilled workmanship and conscientiousness in turning out a first-class product is thoroughly assured.

How Do You Keep Track of Your Wiring Jobs and Stock?

Inadequate Record Keeping and Cost Finding Results in Much Unprofitable Work for the Contractor and Unsatisfactory Treatment of Some Clients—Standardized Methods Slow of Adoption

Gone are the days when the electrical wiring contractor kept his accounts within the circumference of his hatband, or jotted them down on a torn bit of paper to be discarded as soon as the job was finished. That kind of bookkeeping belongs to the days—only a few years back—when the electrical contractor's shop consisted of a pair of pliers and a roll of tape carried in the hip pocket. Those were the days when he bought his supplies from the local hardware store just as he needed them for each individual job.

Although there is a strong tendency toward a standard method of record keeping and cost finding in the modern school of contractor-dealers, most of them still cling to at least a part of some system of bookkeeping they originated—or borrowed from someone else—when they first started in business. Of course, they have been amending and building up their accounting systems as they have found spots that were weak or inadequate to the wider development of their business. But it is the advent of electrical appliances for household use and the addition of merchandising to the contracting field that has really forced the better accounting features upon the business.

The Society for Electrical Development has worked out an adequate system of standardized accounting for retail merchandising. The National Association of Electrical Contractors and Dealers has also placed at the disposal of wiring contractors some of the best talent in the industry in an effort to standardize the making of estimates and the keeping of records and costs of work and materials. The National Electric Light Association has also been doing excellent work along these lines for its members, particularly in the matter of estimating standards. As the result of these efforts there has been a wide reform in the past two years in the matter of eliminating guesswork in favor of positive knowledge of the business based upon actual figures.

Job Reports and Stock Checking.

The electrical contractor is a very busy man, and yet he wants to keep in close daily contact with his accounts; therefore, the best accounting system is that which is the simplest to manipulate and which discloses results without too much effort or the employment of a trained accountant to analyze and interpret the figures. Bookkeepers are, of course, indispensable where the business of the contractor is sufficiently large to require the greater part of his time and attention in estimating new work and keeping a general supervision over the jobs in progress.

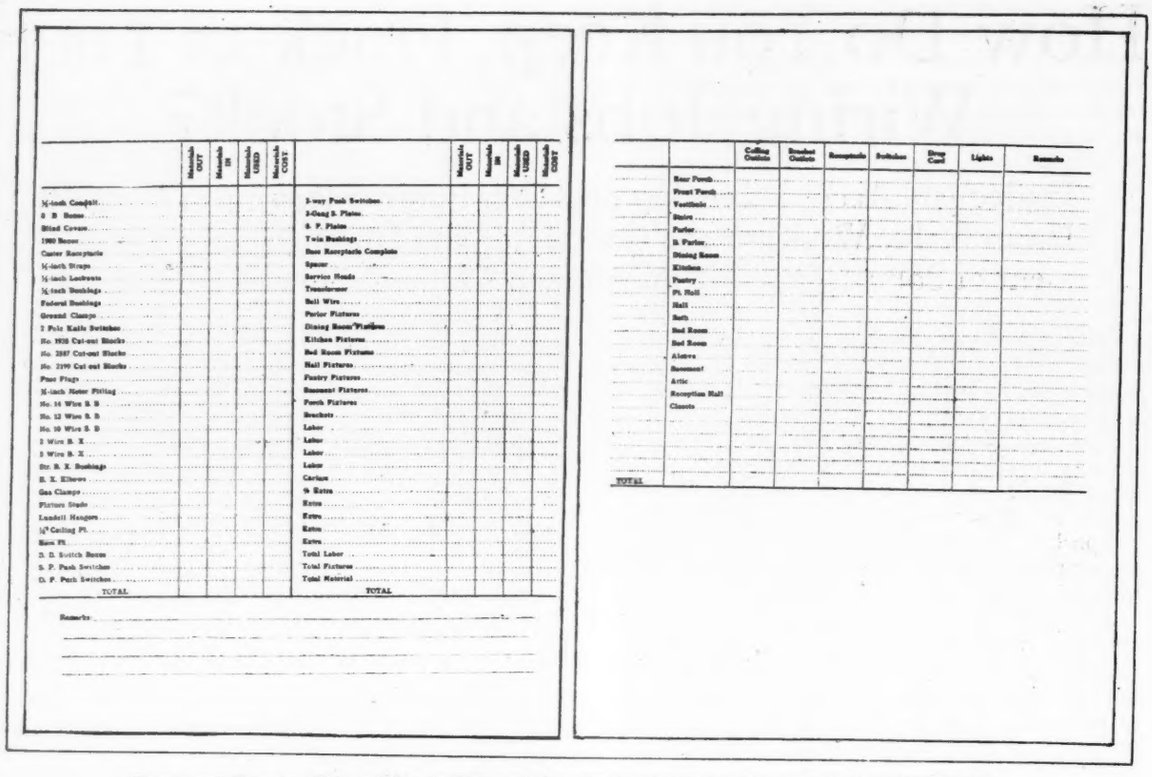
The first requisite toward a proper check on contract work and supplies is a supply of appropriate blanks. These usually consist of daily reports of the wiring foremen, shop foremen and

HOME ELECTRIC COMPANY Date Started _____

JOB REPORT Date Finished _____

	Taken Out	Returned	Used	Cost	Con. Price	Gained	Lost		Taken Out	Returned	Used	Cost	Con. Price	Gained	Lost
Bells								Lock Nuts—¾ Inch							
Buzzers								Lock Nuts—1 Inch							
Bell Wire								Switches—Entrance							
Box—Gem								Straps—Mineralak							
Box—Mail								Plaster Paris							
Box—Switch								Putty							
Box—SB								Tubes—Speaking							
Box—17A								Transformer							
Box—1900								Nails—Finishing							
Box—½ Inch								Nails—Cut							
B.X. Wire								Nails—S P.							
B.X. Bushings								Meter Board							
B.X.L. Bushings								Wi							
[illegible]															
Studs—Fixture								Fixture Permit							
Straps—Porch								Commission							
Switches—Push, S. P.															
Switches—Push, D. P.															
Switches—Push, 3 way															
Screws—Wood															
Lock Nuts—½ Inch															

Form of Job Report Used by the Home Electric Co., Chicago.



Front and Reverse Side of Stock Form of Job Report Used by Many Electrical Contractors.

stock-keeper; job reports for keeping account of the kinds and quantity of supplies taken out and used on the job, record of location of the outlets, etc., the cost of each item of supplies, number and time of each workman, and the number and cost of each item returned unused or damaged at the completion of the job.

One job report blank in much favor among some contractors contains in the first column a list of every item that can possibly be used on any job. In the next column the number or quantity of each item drawn from the stockroom and taken out on the job is set down by the foreman in charge of that particular job. In other columns the cost of each item is listed, and also the total cost where more than one of an item is requisitioned; the amount charged for the items in the estimate; the number or quantity of items returned; the totaled estimate cost of each item used, etc. Even the tools used on the job are accounted for in a blank of this nature, since all tools are requisitioned the same as the supplies from the stock-keeper, and credit given upon their return.

Such a job report affords the contractor ready information concerning the costs on each job, at the same time furnishing the bookkeeper a clear and concise record for entry into the books. The blank itself affords the contractor ready reference in the making of future estimates on jobs of a similar nature.

Contractors have in the past and many of them still design their own report blanks and have them printed locally. There are, however, a number of places where very adequate blanks may be procured in any quantity at a more reasonable rate because they are printed in large quantities from stock forms and may be used without the name of the contractor or contracting company printed at the head. Should the contractor desire to have his firm name printed at the head of the blank reports he can have it done at a local printer's shop, or use a rubber stamp.

A reproduction of one of these stock forms is presented herewith, showing the itemized stock report on the face of a sheet the size of a regular letterhead. On the back is printed the blank for recording the location of outlets, switches, etc., in the different rooms of the building. Some of the blanks make provision for the installation of household appliances.

Stopping the Leaks in the Stockroom.

"Before I established modern methods in stock-keeping I must have lost considerable of my profit in some such wasteful practice as failing to keep a check on supplies and materials furnished to employes," said one contractor-dealer who has built up a successful contracting and merchandising business in Chicago, starting only a few years ago with a pair of pliers and a business card announcing his residence and telephone number.

This contractor now does his own buying of supplies and materials wholesale and employs a reliable young man to maintain his well-equipped stockroom. The stock-keeper receives and records every item coming into the establishment. He receives and honors requisitions for stock only from the superintendents of the wiring crews, his books permitting him to quickly and easily charge out any and all stock requisitioned, and to tell at a glance the quantity of each item on hand at any moment of the day. When the superintendent of the workshop or fixture-assembly department wants any material he also must make requisition on the stockroom keeper.

charging the stock and work against the job for which it is intended and forwarding his memoranda to the office.

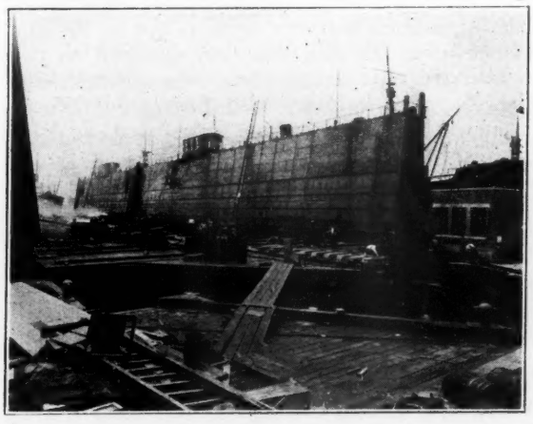
"We are making our estimates with more care than formerly," said the contractor mentioned above. "We try to select our electricians with better care and to know the capacity of each one for work. We thus know very closely how much to estimate for the time of the men on any particular kind of work, We keep close tab on the market prices of materials and, while the element of fluctuation in prices is an uncertain factor these days, we keep within a safe limit in figuring costs of materials. Before the final figures of the estimate are ready for presentation we have taken into consideration everything, even to the wear and tear on the tools and the cost of indemnifying our men against accident."

HIGH-VOLTAGE MOTORS INSTALLED ON A FLOATING DOCK.

Control Apparatus and 2400-Volt Variable-Speed, Wound-Rotor Motors Feature Electrical Equipment on Dock.

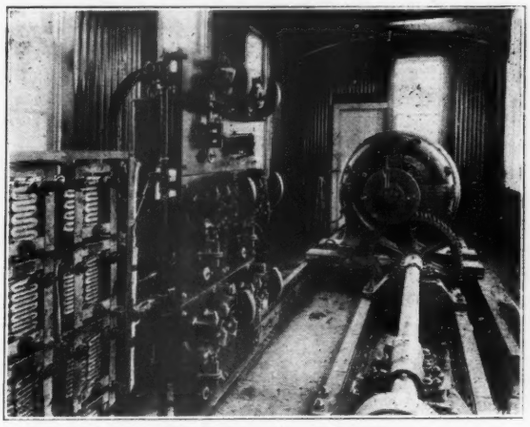
One of the most interesting features of the new 10,000-ton floating dock of the W. & A. Fletcher Co., Hoboken, N. J., is the use of 2400-volt motors for operating the pumps.

Heretofore, only low-voltage (440 volts or less) motors have been used on docks, and where high-voltage current is supplied to the shipyard by a central-station company, it has always been customary to reduce the voltage by transformers before the power is distributed to the motors and other electrical equipment. But in the case of the Fletcher dock, a practice that is becoming general in other industries has been followed; namely, to utilize the high-voltage current without voltage reduction for large motors and thus reduce the cost of the transformer installation.



10,000-Ton Fletcher Floating Dock, Equipped With 2400-Volt Motors.

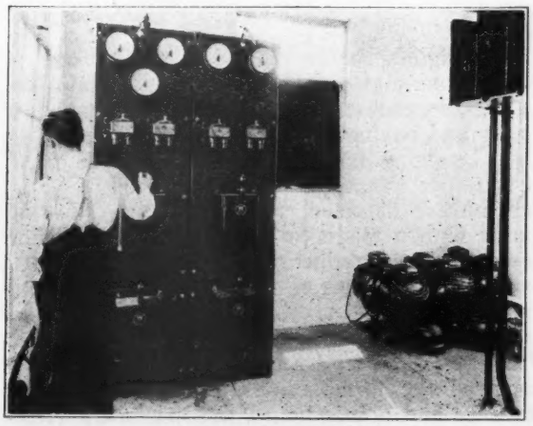
The Fletcher dock, which consists of two sections, one of four pontoons and the other of five, is equipped with eighteen 12-in. centrifugal pumps, each with a rated capacity of 2200 g.p.m. and a maximum speed of 500 r.p.m. These pumps are arranged in four groups, one in each wing of the two sections, and each group is driven through a lineshaft by a motor—a 200-hp. motor driving five pumps in each wing of the larger section, and a 125-hp. motor driving four pumps in each wing of the smaller section. The motors, which are of the Westinghouse variable-speed, wound-rotor type, are located in houses on the wings and are geared directly to the lineshafts.



A-C. Motor Driving Centrifugal Pumps Through Lineshaft—Control Panel and Grid Resistance at Left.

The control of all of these motors is centered in a small brick house on the pier at the end of the dock. Here there is a panel on which are mounted four small master controllers, one for each motor; an operator stationed here can start, stop, slow down or speed up any or all of the pumps as the dockmaster directs. The master controllers do not control the motors directly, but control the opening and closing of magnet switches, which are mounted on panels in each motor house and make the actual motor connections. Hence, the master controllers do not handle the heavy, high-voltage motor current, but only small low-voltage auxiliary currents for operating the switches. The wiring of the control circuits is therefore inexpensive, and the master controllers are perfectly safe to handle.

Mounted on the same panel with the master controllers are four ammeters, one for each motor, which gives the operator full information as to the performance of the motors and enables him to tell at a glance if all are operating properly.



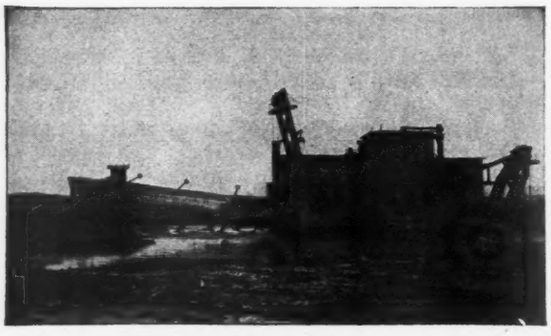
View of Panelboard With Four Small Master Controllers, Installed on Floating Dock.

AN AMERICAN GOLD DREDGE FOR NEW ZEALAND FIELDS.

Gold Is Recovered at a Remarkably Low Cost With Motor-Operated Dredge and Washing Equipment.

An example of the far-reaching activities of American industry is to be found in a gold dredge that has been designed and constructed in this country for the purpose of operating in New Zealand gold fields. This dredge is being built by the New York Engineering Co., and is along the type of dredge constructed for operations in Alaskan fields. The hull is 115 ft. 6 ins. overall, its beam is 50 ft., its depth is 11 ft. and it is built of kauri pine. Power for dredging, pumping and shifting position is furnished by Westinghouse electric motors, while 12 men working four to a shift constitute the crew.

The general method of dredging is as follows: The digging ladder carrying the buckets is lowered and dirt is scooped up. This dirt is dropped on the conveyor belt and is carried to the screen. Here it is screened and washed and the refuse is dropped from the screen to another conveyor belt on which it is carried to the stacker and deposited. The pay dirt that remains is further washed on gold tables, or laundries, and then passed to a gold box where the gold is recovered. Remaining deposit in this gold box are treated



Motor-Operated Dredge for Digging Gold.

about once a week with mercury so that all of the gold is obtained either in nuggets or in the form of an amalgam.

A winch motor is used to change the position of the dredge. On frequent occasions the dredge is shifted to shoal water and the pumps must then be brought into commission before it can be refloated.

The digging ladder carrying the buckets is 100 ft. long and weighs 110,000 lbs. There are 73 buckets, each bucket weighing 3000 lbs. when empty and having a load capacity of about 1050 lbs. Dredging is carried on at the rate of 18 buckets per minute, and a linear speed of 54 ft. per min. is obtained from a 200-hp., slip-ring motor with a magnetic controller for reversing and 50% speed reduction. The screen is 40 ft. long with a diameter of 7 ft. and weighs approximately 6500 lbs. A 50-hp. slip-ring motor operates this screen at a speed of 7 r.p.m. About 8000 gals. of water are used per minute in washing, and the three pumps, high pressure, low pressure and nozzle pump, are driven by Westinghouse squirrel-cage motors of 125, 60 and 25 hp., rating, respectively.

A conveyor belt for the transportation of dirt from the screen to the stacker is 42 ins. wide and 130 ft. long, and the stacker is operated by a 40-hp. slip-ring motor. Winch drive is furnished by a 25-hp. slip-ring motor, and a 10-kw. transformer is used for lighting purposes. All motors are of the three-phase, 60-cycle, 2200-volt, a-c type and have special impregnated windings to protect them from moisture. Complete protection is afforded the motor by overload and no-voltage release; a time element attachment is furnished which permits a definite overload for a definite time before releasing.

Power is furnished by a hydroelectric plant, and feeders are run along the ground to the dredge. As alternating current is used the dredge can be operated a considerable distance from the plant.

Dredges of this type have operated on a cost basis of $0.065 per cu. yd., and in one instance where records are available 418,745 cu. yds. have been dug in a period of two years.

APPEARANCE OF WOMEN IN TRADES RELIEVING LABOR SHORTAGE.

The assimilation of women in industrial plants to handle the less arduous types of work is proving a big aid in offsetting the shortage of labor. When war conditions made it necessary to introduce a feminine personnel into several of its factory departments, the Western Electric Co. through its efficiency engineers not only found that the women workers were as apt as the men they relieved but also that they suffered no personal hardships from their new undertaking. The electrical industry also prospered through the new source of working forces that was thus established.

The results of competitive tests which have been in process during the past year proved that the average woman is possessed of more initiative than the male shop employee and is more anxious to gain a position of responsibility. She has also demonstrated a higher state of morale and willingness to make the best of unknown conditions.

There are more than 5,000 women now employed by the Western Electric Co. at its Hawthorne Works near Chicago. Only 1000 of these are in clerical positions, the greater majority working in the shops.

TELEPHONE CABLE FOR SWEDISH GOVERNMENT.

One of the most important steps in advancement in Europe since the great war has recently been taken by the Swedish government which has ordered from the International Western Electric Co. a long-distance telephone cable to be placed between Stockholm and Göteborg, a distance of more than 310 miles. This cable is the latest type used by the American Telephone & Telegraph Co. and employs relatively small gauge wires but provides first-class service, due to telephone-repeater equipment. By this means a great number of circuits is provided in a relatively small cable at a cost considerably less than an equivalent number of open-wire circuits. This cable is only the first of a large network contemplated by the progressive Swedish government.

EDITORIAL COMMENT

The Contractor-Dealer Strikes His Strides

No more phenomenal progress has been made in the electrical industry recently than in the field of household appliances. And step by step the contractor-dealer has kept pace with that development until today the retail electrical store is as familiar a sight along the business streets of a city as the grocery store, the drug store, the hardware and other stores dealing in the necessities of modern life. This great growth of the contractor-dealer store has been more remarkable during the past two years, and in that short period the owner of the electrical store has become as important a factor in the business life of the nation as the building contractor, the hardware merchant and others who cater to the comfort, convenience and well being of human existance.

Less than five years ago the electrical contractor who did not carry his office under his hat and his tools in his hip pocket was a rare person. His business card usually announced that he would do a good job of house or store wiring if one would just call at his residence or telephone him at the same place. When he obtained a contract he used to buy his supplies at retail from the hardware store. When he sold lighting fixtures he had to assemble them on the job. He was usually looked upon as an ordinary mechanic without any particular business standing in the merchandising field. Since he seldom wore cuffs he usually figured his estimates on the wall, a piece of board or the back of an old letter.

Today we find that the contractor of old has become the contractor-dealer. He has his own store in which his stock of appliances are often displayed in a manner that would do credit to a jewelry store. He has his own workshop in which he does all the fitting and assembling ready for installation on the job. He has his own stockroom in which he carries an adequate amount of supplies and materials which he now purchases wholesale. He has salesmen for his appliances and lighting fixtures, a bookkeeper and a system of accounting that protects him—or should protect him—from errors and losses in business. He employs competent men in his shop and electricians who know how to comply with the various codes, city and national.

The contractor-dealer today has his local, sectional and national organizations, all of which are progressive and helpful. He also has a most helpful ally in the Society for Electrical Development. Today the central-station companies smile upon and encourage him, frequently cooperating with him in campaigns to the mutual benefit of both and the industry in general. If he progresses in the next few years as he has in the immediate past, the contractor-dealer will become a modern Goliath in the electrical industry.

Dishwashers as a Hygienic Boon

A powerful sales talking point and one which is well worthy of being capitalized to the full by the manufacturers of and dealers in electric dishwashing machines was recently offered by Surgeon James G. Cummings, U. S. Army, in reporting upon the influenza epidemic among an institutional population of 252,184.

According to this report, among an institutional population of 252,184, the influenza case rate for that group eating from plates and utensils washed by hand was 324 cases per 1000 inmates as compared with a rate of 108 per 1000 inmates from that group eating from dishes washed by dishwashing machines.

Influenza is literally a malady that goes from hand to mouth; there are many more that do likewise, but which have come in for less prominence. Nevertheless they should be combated by every feasible means. According to the above figures, hand washing of dishes permits at least one disease to attack three times as many persons as does machine washing

Washing dishes by machine instead of by hand reduces very largely although not entirely the human touch. Dishwashers permit the use of more thorough washing and very much hotter water, and perhaps here is found the real reason for the superiority of the washing machine Whatever the reasons, there seems reasonable proof and every theoretical justification for considering the dishwashing machine as a machine for overcoming a custom that is as unhealthy as it is unsatisfactory, namely, hand washing of dishes. It appears, therefore, that there may almost be a moral obligation for hotels, hospitals, restaurants and aboardship and other places where many people come into contact through the medium of eating utensils to do away with hand washing altogether.

The manufacturers of dishwashing machines and dealers and central stations in general would do well to capitalize the hygienic as well as the time and labor-saving potentialities of the electric dishwashing machine.

THE WEEK'S NEWS

Reports of Important Meetings, Developments and Other Happenings of the Electrical Industry and Its Allied Interests

PUBLIC-RELATION SECTION N. E. L. A. PLANS MUCH WORK.

Policy to Be Formulated That Will Harmonize the Interests of Industry and the Public—Publicity Program Approved.

A meeting of the executive committee of the National Public Relations Section of the National Electric Light Association was held in Toledo on Aug. 19. It is perhaps only partially correct to say that the meeting was held in Toledo. It was in fact held on board the steam yacht Tillicum on Lake Erie as a means of combining business with pleasure. Although the meeting lasted throughout only one day, a large amount of business was disposed of.

One of the most important matters considered is the work to be done by the public relations section. This work consists in formulating a policy that will harmonize the interests of industry and the public. Included in this work will be the making of arrangements for co-operation among manufacturers and contractor-dealers and the organization of state committees on public utility information. The organization of these committees in states in which they do not exist was decided upon, the matter to be handled by a committee of which John F. Gilchrist is chairman. The details of the work will be handled at the National Electric Light Association headquarters.

Several other committees were appointed at the meeting. They include one on relations with regulatory bodies, R. H. Ballard, chairman; one on relations with bankers, M. S. Sloan, chairman; one on upbuilding the industry, F. R. Coates, chairman; one on utility taxation, personnel not selected; and a sub-committee of the committee on relations of regulatory bodies, personnel not selected. The necessity of these committees is apparent. Already some utility companies are doing an interstate business and others are planning on expanding across state lines. In certain instances the laws of some of the states make this expansion onerous or even impossible although the expansion of territory would be economical for customers in all states served.

The special object of the committee on relations with regulatory bodies is to study and compare the rulings of the various state commissions. This work will involve collecting the rulings and digesting them in an effort to tie them together and stabilize them. The work of the committee on upbuilding the industry will consist of harmonizing the interests of the central stations, manufacturers, jobbers and contractors. It is felt that the interests of all of these branches of the industry are common. By establishing relations between them that will cause them to co-operate and work together, each interest will be assisting, not only itself, but the entire industry.

The meeting approved the publicity program of the N. E. L. A. and considered the matter of forming public relations sections in the different geographic divisions. Those who attended the meeting are: Martin J. Insull, Chicago; J. E. Davidson, Omaha; M. S. Sloan, Brooklyn; John F. Gilchrist, Chicago; A. Hardgrave, Dallas; H. C. Blackwell, Kansas City; F. R. Coates, Toledo, and H. M. Aylesworth and G. F. Oxley, of the association headquarters, New York City.

JOINT MEETING OF CENTRAL-STATION ORGANIZATIONS.

The Rocky Mountain Section of the National Electric Light Association will meet at Glenwood Springs, Colo., Sept. 13 to 15, and as the Colorado Electric Light, Power & Railway Association will convene at the same time, it was decided to hold a joint meeting at the Colorado Hotel. The two organizations will hold separate business sessions, and matters of general interest to both bodies will be discussed at joint meetings. The executive committee of the Rocky Mountain Section arranged these preliminaries at a meeting in Denver last month, at which time the following appointments were made: Bulkeley Wells, president Western Colorado Power Co., Denver, was appointed chairman of the Public Relations Section, and T. O. Kennedy, general superintendent Denver Gas & Electric Light Co., chairman of the Technical Section.

MICHIGAN CONVENTION FEATURES PUBLIC RELATIONS.

Financing, Publicity and Various Phases of Regulation Are Discussed by State Section of N. E. L. A.

Education of the voter was described by the Hon. W. M. Smith, chairman of the Michigan Public Utilities Commission, as the best and surest means of securing justice for the utility interests at the hands of the public at the opening session of the convention of the Michigan section of the National Electric Light Association, held at Ottawa Beach, Aug. 24-26, 1920. Mr. Smith reviewed briefly the growth of the electric utilities of the state from 1885, when it was first proposed to investigate the feasibility of lighting the state capitol building, to the present time when the electric-utility interests represent an investment of about $150,000,000.

It has been proposed, according to Mr. Smith, that Michigan utilities be placed under absolute home rule in every city, town or village by constitutional amendment. There are between 1700 and 1800 such local governments in the state, and such an amendment would result in the

establishment of probably 1600 regulating bodies. It was pointed out that such an arrangement would result in a situation detrimental to both the public and the utility companies, the interests of both being so closely tied together that an injustice imposed on a public-service company works fully as great a hardship on its customers, the general public.

The public must be educated to a knowledge of the duties and privileges of a utility company, and must come to understand that earnings enough are required to pay a reasonable return on investments if service is to be given. The time is passed when valuable gifts are made to secure the erection of utility plants, and fortunes can no longer be made by the capitalizing of free franchise rights. It is up to the owners of these properties to educate the public to the facts as they exist today, and to convince the average man that his welfare depends very greatly on the welfare of the great companies serving him, according to Mr. Smith.

State Laws in Need of Revision.

The laws of Michigan, like the laws of many other states, have been developed in a rather loose manner, and are in need of much revision to provide more uniform conditions of utility regulation. It was suggested that central-station people should study the situation, carry on an organized campaign of education and be prepared to point the way to good legislation wherever opportunity presents itself.

In summing up his remarks Mr. Smith stated that a utility should be granted rates sufficient to pay operating expenses, taxes and maintenance costs, and in addition to take care of depreciation and reserve funds and pay such returns to investment as will secure the required new capital for improvements and extensions. He estimated the new capital now required for electric-utility extensions in the state at about $25,000,000, the needs of all utilities being in the neighborhood of four times this sum. Good management, in his opinion, is entitled to a higher investment return than poor management, and the public will be best served by arrangements that provide for such a condition. State regulation in some form, he said, would best conserve the interests of the people.

J. V. Oxtoby, H. M. Aylesworth and others talked briefly concerning the ideas presented by Mr. Smith. All were in accord with his remarks and expressed appreciation for the straightforward manner in which he had dealt with the subject in hand. All were of the opinion that the commission was doing good work in the state.

Work of the National Electric Light Association.

Various phases of the activities and new organization of the National Electric Light Association were discussed by Martin J. Insull, its president. He called attention to the redistricting of the country in geographic sections, and told also of the service provided for members by the staff of the central organization. Particular attention was called to the work of the technical and publicity branches of the general office.

The new public relations section of the association was designated as one of its most valuable units. This section is intended to deal with the many and complicated relations arising through contact of the industry with the public. Mr. Insull stated that he appreciated many of the trying situations that had been faced by the various state regulating commissions, and said that in general they had been fair in their dealings with the utilities. The chief trouble encountered has been the long time required to secure a revision of rates, it often being necessary to ask for a new rate almost as soon as a revision had been determined upon.

Economic Problems of the Utility Company Are Peculiar.

Difficulty in realizing the difference between a utility and an ordinary business was given as the chief reason for much of the present opposition to satisfactory rate revisions. The ordinary business with which most men are acquainted is able to turn over its investment several times a year, interest on the actual investment being only a small portion of the costs of operation. In contrast to this the utility company can turn its investment only about once in five years, the interest charges being one of the large items of cost. Mr. Insull recommended that this and other facts be told frankly and fully to the public so that the fundamental economic basis of the utility business may be understood.

Attention was called to the fact that the net earnings of various companies have not increased in nearly the proportion of the gross earnings for some time past. The industry is using up its reserve capacity, and the increased net earnings are not now sufficient to properly finance the extensions that are required to give good service. Although net savings from gross business are still decreasing, Mr. Insull was of the opinion that the hardest times had been passed. The people have learned a lesson from the existing railroad situation and are not now anxious to have the same conditions prevail in other utilities. Electrical utilities are closer to the average home and will receive consideration quicker than the more intangible organizations like railroads. Mr. Insull was of the opinion that money was now easier to obtain than in the immediate past and that the prospects for the future were bright.

Public Ownership Not a Solution of the Utility Problem.

Talking from his own personal experience, H. M. Aylesworth, executive manager of the National Electric Light Association, told of many difficulties attending the operation of utilities under public ownership and home rule. Recent troubles in Denver, Colo., were attributed directly to home rule, street-car fares being reduced and raised and strikes blocking the entire city and resulting in riots. Mr. Aylesworth is particularly fitted to discuss the Denver situation, having been chairman of the Colorado Utilities Commission in the past.

Failure of the public-ownership schemes of Seattle, Wash., were characterized as the inevitable result of conditions that arise under all such methods of operation. Seattle now wants to face the situation as it is, admit its failure, and come to a settlement.

Hardships of home rule on small towns, the duties of the public, the value of proper advertising and co-operation with customers and the general public were all discussed in an interesting manner. Recent incidents in connection with the Toledo, O., street-car service were cited in demonstration of the vital need of a community for its utility services.

In summing up his remarks, Mr. Aylesworth stated that there was now a power shortage, that there were 14,000,000 unlighted homes in the country, that the present railroad situation had opened the eyes of the public and that the future of the central-station industry was very bright. He was of the opinion that a campaign of optimism would induce the public to invest needed new capital in utility securities, and that such investment would constitute the best form of public ownership.

Results Accomplished by Committee on Public Information.

Information on utility matters may be spread by personal effort, by talks before clubs and through daily and weekly papers, according to B. J. Mulaney, chairman of the committee on public information in Illinois. Mr. Mulaney told of the results accomplished in a little over a year, stating that practically every one of the 900 newspapers in Illinois published materials supplied by his committee. He pointed out that public opinion is formed only a little at a time, and that a continual presentation of a situation or idea is required to establish it in the minds of the people.

A great volume of material has been published in Illinois, speakers have been provided to appear before many clubs and other gatherings, lecture materials have been provided and distributed, and much information has been sent to educational institutions as a result of the work of the committee. As a guide in the organization of committees in other states, Mr. Mulaney stated that it was essential to enlist all the utilities in the state whether they could contribute to the financing of the affairs or not. He believes that a newspaper man is best suited to handle publicity matters because of his knowledge of the methods of preparing printable and readable copy. Materials used for publication should be informative, but never argumentative or controversial. Co-operation with the local public-utility manager is essential to the accomplishment of the best results. Last, and most important, the committee should be composed of men whose interests are at stake, and they should hold regular meetings at frequent intervals to go into the details of all phases of the work.

Technical Paper Covers Metering Problems.

Maintenance of meters was thoroughly discussed in a paper by J. C. Langdell of Jackson. A period of from 30 to 48 months was given as the proper testing interval for meters used on the ordinary residence service. Attention was called to the recalibration of meters found to be registering incorrectly, and it was pointed out that such meters should not be put back into service until the actual cause of the inaccuracy had been found and corrected. It was stated that the average utility company had not taken a sufficient interest in the proper installation of meters and that as a result the loss in unregistered power and the cost of meter maintenance was greatly increased. The three most important items in meter installation were designated as the conduit entrance, steel service cabinet and proper grounding of the secondaries.

Much stress was laid on the selection and use of the steel service cabinet. It was stated that the ordinary inclosed switch was not a satisfactory form of service equipment, a cabinet being required of such design as will provide for inclosed meter connections, suitable testing arrangements and outside operation of the switch.

Water pipes afford the only safe and reliable structure for the grounding of secondaries. Driven grounds are unreliable, and ground plates are quite expensive to install. The water-pipe connection is ample in capacity, cheap to make and is safer and better from every point of view. Various points in this paper were discussed by E. A. Lueky, Detroit; J. C. Langdell and others.

Boiler-Room Practice Discussed.

Various practices for the attaining of high efficiency and uniform operating conditions in the boiler room were taken up in a paper by R. G. Felger, Detroit. The Detroit Edison Co. is using boilers of 2365 hp. rated capacity, these boilers being of the Sterling "W" type. Stokers are installed on both sides of the setting and ash is removed through grinders running down the space between the ends of the grates. Distilled water is used for boiler feed, thus reducing the blow-down losses to a minimum.

Special furnace construction, large ash pits, carefully planned baffle construction and other features help to keep the boilers operating at their best. One of the particular features of Detroit Edison Co.'s operating practice is the method used in managing the equipment. Each man is entirely responsible for his own unit and is expected to make it deliver the required service. Instruments are provided so that the operator may know at all times just what each unit is doing. D. J. Stellingworth, Jackson; R. B. Harris, Detroit; C. H. Berry, Detroit, and others took part in the discussion following the presentation of this paper.

Standardized construction was taken up in a paper by B. L. Huff, Jackson. Mr. Huff showed how standardization reduces costs, insures reliable service, makes construction of all kinds easier and faster and at the same time results in better appearing work.

State Regulation Better Than Home Rule.

State control of public utilities was declared to be best by W. J. Hagenah, Chicago, in a paper discussing various phases of the regulation problem. It was pointed out that home rule had failed because of its inherent weaknesses, and that state regulation was the only logical means of control. Utilities are not local in their operations and cities are not in a position to make the detailed studies required to determine what rates should be or what service conditions are attainable and economical. Howard Pett, Jackson, and others took part in a lively discussion following this paper.

Electric service must be given to the farmer in

the near future, according to a paper by Prof. A. R. Sawyer, East Lansing. The comforts and economy of such service will be required to induce enough people to remain on the farm to produce the food supplies of the country. H. Sylvester, Ann Arbor, discussed this paper and pointed out a number of the difficulties met in attempting to give central-station service to rural districts. It was pointed out that the farmer must pay the costs of his service. Geo. E. Lewis, Ann Arbor, called attention to the desirability of proper wiring construction on the farm.

A very interesting paper by H. A. Snow, Detroit, dealt with the problems of statistical work and showed the value of statistics. Accurate and reliable figures are the sign posts of business and indicate, if properly read, the direction and distance to a given end.

APPLIANCES AND THE CENTRAL-STATION BUSINESS.

Popularizing of household appliances was advocated in a paper by C. H. Bay, Detroit. He advocated the encouragement, on the part of central-station companies, of the sale of all kinds of reliable appliances. The sale and use of these devices will add to the income of the company in addition to greatly lessening the burdens of housework.

Machine bookkeeping practice was discussed in a paper by C. H. Hunsburger, Grand Rapids. After describing many details of the operating methods, he showed that the installation of billing and posting machines had reduced the cost to his company of this work by 14%.

OFFICERS ELECTED FOR THE ENSUING YEAR.

Officers elected for the coming year are Geo. E. Lewis, president, Ann Arbor; J. K. Swanson, first vice-president, Jackson; E. Holcomb, second vice-president, Alma; H. Silvester, secretary and treasurer, Ann Arbor. W. M. Lewis, Muskegon; S. B. Tuell, Houghton; R. E. Keller, Kalamazoo; Thos. Chandler, Sault Ste. Marie, and F. D. Avis, Hudson, were chosen as members of the executive committee.

RULES DRAFTED BY FEDERAL POWER COMMISSION.

Conferences Being Held in Washington to Formulate Regulations for Use of Water Power and to Organize Commission Staff.

Members of a sub-committee of the water power development committee of National Electric Light Association are attending conferences in Washington between the Federal Power Commission, representatives of government departments and outside advisers for the purpose of aiding in drafting rules and regulations and forms of applications and permits to be used by the power commission. These conferences will form the basis for future action, and upon the plans outlined will depend the organization of the commission's staff.

The N. E. L. A. was represented by Franklin T. Griffith, chairman of the committee on water power development; W. A. Brackenridge, vice-chairman; Morris Cohn, Harris B. Freeman, Thomas W. Martin and G. W. Talbot, members of the committee. Chief Engineer Thurlow of the Alabama Power Co. is associated with the committee. Among others who attended or were represented at the conferences were Secretary Baker, Secretary Meredith and Secretary Lane; Secretary Merrill of the commission and his assistant, Mr. Randal; the Judge Advocate General, Major General Enoch H. Crowder, and Major L. W. Call of the Judge Advocate General's department, who is acting as counsel for the commission.

Fred W. Herbert of the service department, N. E. L. A. headquarters, was called to Washington to look over the accounting plans of the commission and to offer suggestions on behalf of the N. E. L. A.

It was announced that offices of the power commission will be located in the Interior Department offices in Washington.

TO ORGANIZE GREAT LAKES SECTION OF THE N. E. L. A.

A meeting was held on Aug. 27 in the Chicago offices of Martin J. Insull, president of the National Electric Light Association, to discuss plans for the organization of the states of Illinois, Wisconsin, Michigan and Indiana in the Great Lakes Section of the N. E. L. A. H. M. Aylesworth, executive manager of the association, was present at the conference, in addition to various officers of the existing state associations.

NEBRASKA SECTION, N. E. L. A., TO CONVENE IN OMAHA.

Annual Convention Program Covers Important Subjects—Entertainment for Members and Guests Will Be Feature of Meeting.

An interesting program has been arranged for the annual meeting of the Nebraska Section of the National Electric Light Association on Sept. 8 and 9 at Omaha, with headquarters at the Hotel Fontenelle. The first day's proceedings will be opened by an address of welcome by Hon. E. P. Smith, mayor of Omaha, after which the following subjects will be taken up: "Central-Station Merchandising," by T. E. Roach, Union Light & Power Co.; discussion on this paper will be led by W. S. Byrne, Nebraska Power Co., and M. A. Curran, Western Electric Co.; "Legal Obligations of the Central Station," by J. A. C. Kennedy, Nebraska Power Co.; "Promotion and Development of Rural Transmission Lines," by S. H. Brooks, Continental Gas & Electric Co., discussion led by A. J. Cole, Platte Valley Power Co.

The afternoon will be set aside for an electric field event at the Omaha Field Club, where golf matches and horseshoe-pitching contests will be indulged in. In the evening dinner will be served at the Omaha Field Club, with J. E. Davidson as toastmaster. The subject down for discussion is "Public Relations in Nebraska," which will be started by W. B. Roberts, president Union Power & Light Co.; Horace M. Davis, Nebraska Committee on Public Utilities Information, and L. R. Wilson, general commercial superintendent of the Nebraska Telephone Co.

On Thursday, Sept. 9, the program will consist of an address on "The National Association,"

by M. H. Aylesworth, executive manager of the National Electric Light Association; an address by Thorne Browne, Nebraska Railroad Commission, and a paper on "Illuminating Engineering and Lighting Development," by H. E. Mahan, General Electric Co. Reports of committees will conclude the morning session. The afternoon will be taken up with a luncheon at the Fontenelle Hotel and meetings of the executive committee. Visitors are invited to inspect the power plant and new electric shop of the Nebraska Power Co.

SPOKANE TO WELCOME NORTHWESTERN DIVISION, N. E. L. A.

Program Committee Aiming to Make Annual Convention One of the Most Profitable Ever Held—New Hydraulic Power Committee to Confer.

The annual convention of the Northwestern Geographic Division of the National Electric Light Association will be held on Sept. 8 to 11 at Spokane, Wash., and Martin Insull and M. H. Aylesworth, president and executive manager, respectively, of the national body, have been invited to attend the gathering, which will include a conference of the new hydraulic power committee of the National Electric Light Association. Among the members of this committee are the following western engineers: Markham Cheever, chairman, Salt Lake City; J. B. Fisken and B. M. Merrill, Spokane; J. P. Jollyman, San Francisco; G. C. Sears, Seattle; H. A. Barre, Los Angeles; C. O. Poole, Riverside, Cal., and H. H. Schoolfield, Portland, Ore.

The proceedings will be opened on Sept. 8 with an address by President J. B. Fisken, followed by routine reports, and at noon one of the officials of the National Electric Light Association will give an address before the Spokane Advertising Club. J. S. Simpson, chairman of the accounting section, will present his report, and A. C. McMicken will submit a review of the National Electric Light Association's range and water heater report.

The report of the hydroelectric and technical section will be given by Chairman G. E. Quinan on Thursday morning, Sept. 9, discussion of which will be held in the afternoon, together with the safety report. An address on a public utility subject will be given in the evening, with an opportunity for a comprehensive discussion to follow.

Friday's session will be devoted to a report of the advisory committee on co-operation of electrical interests by R. W. Clark, chairman. George L. Myers, Public Relations Section, will speak on "Public Utilities Competition" in the afternoon, and Franklin T. Griffith will talk on "Successful Public Utility Management of the Future."

The entertainment features include the annual banquet at the Davenport Hotel on the evening of Sept. 10, and on the following day a competition for the Kilowatt Golf Club cup will be held at Hayden Lake. The Interstate Fair will be held in Spokane at the same time the Northwestern Geographic Division is in session, and arrangements are being made by the committee for the members and guests to visit the fair as well as other points of general interest.

EFFECT OF WATER-POWER ACT ON PRIVATE ENTERPRISE.

At a recent hearing before the Federal Power Commission, S. Z. Mitchell, president of the Electric Bond & Share Co., stated that under strict construction of the water-power act it is almost impossible to finance large undertakings, and that the act should be amended in order to attract capital. In projects requiring five years or more to build the companies must be allowed to amortize earnings from the day on which they receive their capital from investors, Mr. Mitchell declared, as no company could afford to pay interest on the millions involved in construction unless permitted to assess rates when the operation was completed, which would make up any deficit incurred during the construction period. The law makes no provision for this form of amortization, Mr. Mitchell stated.

John Barton Payne, Secretary of the Interior, intimated that the water-power companies must stand on their own bottoms, the function of the commission being to give all possible leeway to private enterprise and not to hinder such projects. The companies must work out their own financial problems, with the understanding that they will receive fair treatment from the government.

COMING CONVENTIONS.

Nebraska Section of the National Electric Light Association. Annual convention, Omaha, Neb., Sept. 8-9. Secretary, B. H. Conlee, Nebraska Gas & Electric Co., Beatrice, Neb.

Pennsylvania Electric Association. Annual convention, Bedford Springs, Pa., Sept. 8-11. Secretary, H. M. Stine, 211 Locust street, Harrisburg, Pa.

Northwestern Geographic Division of the National Electric Light Association. Annual convention, Spokane, Wash., Sept. 8-11. Secretary, L. A. Lewis, Washington Water Power Co., Spokane, Wash.

Rocky Mountain Section of the National Electric Light Association and Colorado Electric Light, Power & Railway Association. Joint meeting, Glenwood Springs, Colo., Sept. 13-15. Headquarters, Colorado Hotel.

Association of Edison Illuminating Companies. Annual convention, Eastern Point, New London, Conn., Sept. 13-16. Headquarters, Griswold Hotel. Secretary, Preston S. Millar, 80th street and East End avenue, New York City.

New England Section of the National Electric Light Association. Annual convention, Kineo, Me., Sept. 13-16. Secretary, O. M. Bursiel, 149 Tremont street, Boston, Mass.

Illuminating Engineering Society. Annual convention, Cleveland, Oct. 4-7. General Secretary, Clarence L. Law, 29 West 39th street, New York City.

National Association of Electrical Contractors and Dealers. Annual convention, Baltimore, Md., Oct. 4-8. Headquarters, Southern Hotel. Secretary W. H. Morton, 110 West 40th street, New York City.

Empire State Gas & Electric Association. Annual convention, Utica, N. Y., Oct. 7-8. Headquarters, Hotel Utica. Secretary, Charles H. B. Chapin, 29 West 39th street, New York City.

National Association of Electrical Inspectors. Annual meeting, Philadelphia, Oct. 12-13. Secretary, W. L. Smith, Concord, Mass.

International Association of Municipal Electricians. Annual convention, New Orleans, La., Oct. 19-22. Secretary, Clarence R. George, Houston, Tex.

Electric Power Club. Fall meeting, Hot Springs, Va., Nov. 15-18. Headquarters, Homestead Hotel. Secretary, C. H. Roth, Adams and Loomis streets, Chicago.

CONTRACTING-CONSTRUCTION

A Department Devoted to Various Problems Relating to the Installation, Operation and Maintenance of Electrical Equipment

INSULATING JOINTS NOT REQUIRED BY 1920 CODE.

Grounding of Socket Shells Is Substituted for Insulating Joints and Canopy Insulating Rings in Certain Cases.

The 1920 edition of the National Electrical Code, now being printed, provides that electric lighting fixtures may be installed without the use of insulating joints and canopy insulators under certain conditions. The determining factors as to the use or omission of insulating joints are, primarily, grounding and protection of persons against shock. The following statement describes cases where insulating joints and canopy insulations may be omitted:

Insulating joints and canopy insulations may be omitted with straight electric fixtures connected to knob and tube, wooden-raceways or open work, except on metal ceilings or on plaster walls or ceilings containing metal lathing; with straight electric fixtures installed on grounded raceways when the grounded wire of the supply circuit is connected to the screw shells of sockets and receptacles, and approved fixture wire is used; with straight electric fixtures which are permanently and effectively grounded to a separate ground wire not smaller than No. 14 B. & S. gauge.

The second of the above conditions is new. and, following its adoption by the electrical committee of the National Fire Protection Association at its meeting in March, the question of determining the most practicable, permanent and effective means for identifying the particular wire of electric fixtures which is always to be connected to all screw shells of sockets or receptacles has been under consideration by fixture manufacturers, underwriters' laboratories and others interested.

As a result of this consideration notices, effective Oct. 1, 1920, have recently been sent out to parties interested. The notices, pertaining to this type of construction, contain the following information: All shells of sockets and receptacles in wired electric fixtures must be connected to the marked or polarized terminal wire. In fixtures having more than one circuit, the polarized wire of each circuit must be separately marked. The identification of the wire or wires so marked shall consist of a band of black paint on a white conductor or a band of white paint on a colored or black conductor. In straight electric fixtures so designed that no splices or joints are necessary in the conductors and which are not completely assembled or wired at the factory, but which are provided with sufficient conductor of a size and type suitable for the particular fixtures, a tag must be attached reading as follows:

"If this fixture is installed without an insulating joint, all screw shells of its sockets must be connected to the same supply wire which must be the neutral or grounded wire, if the supply circuit is grounded.".

MANUFACTURE AND QUALITIES OF INSULATING MATERIALS.

Asbestos, Varnishes, Tapes, Waxes and Other Materials Have Properties Suitable to a Given Use.

By L. W. Allison.

A definite knowledge of raw materials as used in electrical work is of distinct value to those engaged in this industry. The more that is known of the derivation of common articles or substances, the better we are equipped to handle work requiring the use of materials of such nature as the occasion arises. Manufacturers in different phases of the industry are developing valuable information from time to time through their research departments, and these thoroughly practical data should be utilized by the electrical man whenever made available. Among the prominent interests in the trade engaging along these lines is the Mitchell-Rand Manufacturing Co., New York City, manufacturer of electrical insulation products, the results of its work being compiled in a new handbook known as "Everything in Insulation." The information here given is included, with a great variety of other data, in the new handbook on insulating materials.

Friction tape.—Friction tape is a trade term used to designate certain grades of electrical tape, the name being derived through the process of manufacture. Long, staple, unbleached-cotton sheeting is used for this material, it being first passed over a series of drying drums to expel all of the moisture. The first or "filler" coat is then applied, impregnating the fabric with a permanent insulating, waterproofing and preserving compound. After the application of the filler coat the fabric is set aside for several days to dry. The second coat, containing a high percentage of rubber, is then forced through the fabric by large steel rollers. The upper roller, weighing about ten tons, moves in the same direction as the cloth, but slightly faster. By varying the speed of this upper roller, or in other words increasing the friction, the thickness of the compound applied can be gauged to within a limit of 0.001 in.

Tapes and webbings.—Untreated tapes are used in winding coils for armatures and fields of motors and generators, coils of transformers and other electrical apparatus. These materials are not affected by temperatures up to approximately 250 deg. F. While essentially non-conductors tapes are employed as binders merely because of their tensile strength, and it is only the varnish with which they are impregnated that furnishes

the insulation. Varnish also greatly increases both the heat-resisting and dielectric properties of the tape itself. The more open the tape, the greater the amount of varnish it will carry and the higher its value as insulation.

Asbestos.—Asbestos is a remarkable mineral, being fireproof and impervious to the action of acids. It is found in Italy, China, South Africa, Russia, Canada and in various places in the United States. Extensive deposits are being worked in Arizona, California, Wyoming and Montana. Depending upon the source from which they are taken, the fibers are long, delicate, flexible and elastic, or short, stiff and brittle, each kind having its advantages for different purposes.

It is generally conceded that the highest grade of asbestos for textile purposes comes from Canada, the deposits in Quebec supplying a loose, silky, flax-like fiber of high tensile strength and, what is more important to the electrical industry, free of iron.

After the mineral is mined, or rather quarried, it is crushed and the long fibers are carded and spun into yarn in much the same manner as cotton or wool is carded and spun. The yarn, in turn, is woven into listing and cloth, or braided into sleeving. For this latter purpose the short fibers never should be used.

Other materials.—The extensive range of insulating materials now on the market makes necessary a wide diversity of information covering simple as well as rather complicated questions. For this reason, a handbook of the character mentioned is distinctly valuable for frequent reference. It explains how armature twines are to be gauged with accuracy, how insulating waxes are made, how saturating compounds are used, how varnished tubing and many other products are made.

DEPARTMENT COMMENTS ON ELECTRICAL CONSTRUCTION.

Service Switches and Meters Should Be Inside the Building—Apartment Hotels Should Have Circuit for Each Apartment.

Inspection of electrical construction work involves a continual following of the development of building construction and apparatus manufacture. The Electrical Inspection Bureau of the City of Chicago has issued a number of interpretations, given below, relative to the application of existing rules to certain construction developments.

Location of Service Switch in Apartment Buildings.—In two or three-story apartment buildings where there is no attic and where there is either no basement or where the basement is used for living quarters, the service switch should be placed in the first floor apartment and the meters in the public hall, if there is sufficient space or, if not, in the several apartments.

In two or three-story apartment buildings where there is no basement or where the basement is used for a living quarters, but where there is an attic reached by a permanent stairway (generally used by tenants for drying clothes), the service switch and meters for all apartments should be placed in this attic.

Service Switches and Meters on Rear Porches.—Service switches, cutout boxes and meters must be installed inside the main walls of the building. The placing of these devices in storm sheds, storm boxes, rear porch inclosures or any portion of a building which is attached to the main building will not be approved.

Apartment Hotels.—Hereafter this department will classify "apartment hotels" as "apartment buildings" and will require one or more circuits to each apartment. In other words, installations having more than one apartment connected to one circuit will not be accepted. An apartment hotel may, for the purpose of this rule, be defined as a building made up of apartments which contain kitchens or kitchenettes. This ruling has been found necessary as an investigation of buildings of this type indicates that where one circuit supplies more than one apartment the circuits are constantly overloaded and overfused due to the use of electrical household devices.

Capacity of Knife Switches.—The first sentence of the seventh paragraph of Rule 24c (page 87 of the Code) reads: "Knife switches used to break currents must be limited to the following capacities: Three-pole switches, 1000 amperes; two-pole switches, 1500 amperes; single-pole switches, 3000 amperes."

The rule refers only to switches which "break" current. This rule will not be interpreted to apply to switches that are used only to "make" current. In other words, where both a circuit-breaker and a knife switch are used (as in generator leads, for instance), the switch is used only to complete the circuit after the circuit-breaker has been closed. The circuit is always broken by means of the circuit-breaker. Where knife switches are used in this manner their capacity is not limited to the current ratings given in the rule referred to above.

TENNESSEE CONTRACTOR-DEALERS TO HOLD MEETING.

Wide Range of Papers on Electrical Retailing to Be Presented at One-Day Meeting to Be Held at Nashville, Sept. 4.

Numerous subjects in connection with the sale of electrical appliances will feature the ninth annual convention of the Tennessee Association of Electrical Contractors and Dealers, to be held at Nashville, Sept. 4, with headquarters at the Tulane Hotel.

The morning session will be opened with an address by Gov. A. H. Roberts of Tennessee on "The Public Utilities Commission." He will be followed by J. P. Lawrence, Nashville, on "First Aid to Public Utilities"; W. H. Synans, Nashville, on "Selling Appliances on Term Payments"; H. G. Street, Memphis, on "Comparison of Profits in Electrical and Hardware Trades," and P. W. Curtis, Chattanooga, on "Proper Handling of Fixture Sales."

The program for the afternoon session will include addresses by W. R. Herstein, Memphis, on "The Tennessee License Law"; J. A. Fowler, Memphis, on "Conducting a Retail Store"; E. S. Dunham, Memphis, "Electrical Advertising"; I. A. Corcoran, Schenectady, N. Y., on "Window Display"; O. G. Heinke, Nashville, on "The Mazda Lamp," and C. R. Wright, Knoxville, on "Fall and Winter Business Outlook."

Following the afternoon session there will be a dinner given by the Nashville Electric League. A sight-seeing tour to Hermitage and Powder Plant has been arranged for Sunday, Sept. 5.

ARTICLES ADMITTED INTO AUSTRALIA DUTY FREE.

The following articles may be admitted into Australia free of import duty under special license for use in the manufacture of other commodities: Graphite electrodes; clear ruby mica for lampware, brass tubing for lighting systems, 3/16-in. and under.

CONTRACTOR-DEALER

An Exchange of Ideas and Experiences on Advertising and Selling Methods, and Store-keeping for the Dealer in Electrical Goods

VIEWS OF INSTALLATIONS USED IN WINDOW DISPLAY.

Contractor-Dealer Has Photographs Taken in Homes of Customers and Uses Them to Advertise His Merchandising Business.

Recently a contractor-dealer in a western city employed a commercial photographer and obtained permission to take some views of well-lighted homes in which he had completed the contract for wiring and installing the fixtures. Those photographs which presented the most attractive scenes and examples of lighting were enlarged. With some other views showing installations of washing machines, vacuum cleaners, percolators and a few other appliances placed by him in local homes, the contractor-dealer dressed up a pictorial window display. Cards announced the names and addresses of the residences in which the photographs had been taken. It proved an excellent advertisement. The original photographs from which the enlargements had been made for the window were bound in an album placed on a convenient table surrounded by chairs for visitors who wished to rest or wait for friends.

CLOTHES WASHERS IN WINDOW DEMONSTRATION.

Broad, Deep Show Window Lends Itself to Large Working Exposition of Electric Washing Machines and Attached Wringers.

Wherever possible electrical dealers have made the most of window displays and demonstrations this summer to reap their individual shares of the immense business done in washing machines and wringers. It is the claim of many dealers that this season has thus far seen the sale of more washers than of any other single appliance.

The illustration herewith shows how one dealer utilized his large window space to stage a demonstration of washing machines and multiple-position wringers. The window was sufficiently large to accommodate several visitors who were invited in groups to witness the demonstrations at close quarters.

Large Washer Display Which Accommodated Visitors in the Window.

DISPLAYING UTILITY OF TWO-WAY PLUG IN THE WINDOW.

Value of Display Lies in Demonstrating the Use of Plug as a Convenience in Connecting Lights and Household Appliances.

In preparing the window display illustrated herewith the object was to show the use to which the little two-way attachment plug may be put rather than to show the particular design of the plug itself. The simplicity of the dressing of the window space enhances rather than detracts from the value of the demonstration.

Effective Demonstration of a Two-Way Plug in the Display Window.

In one of the back panels a receptacle is placed at about the elevation of the top of the baseboard. Two white arrows point to where the two-way plug is inserted in the receptacle. One of the connecting cords leads to a lamp upon a pedestal, while the other is connected with the vacuum cleaner on the opposite side. In the center of the display is an illuminated sign of the manufacturer.

FANNING THE SIDEWALK CROWDS TO ADVERTISE ELECTRIC FANS.

During several very hot days this summer an electrical dealer in New York City attracted the attention of those who passed his store in a manner that was most gratifying to many who could spare a few moments to enjoy a brief respite from the heat. Upon the bracket at one side of the entrance to the store the dealer secured a 16-in. oscillating fan which he kept operating at

full speed. It caught and held the attention of the crowds, and while they reveled in the luxury of the breeze they studied the display of fans in the window and read the cards announcing a special sale at attractive prices. The demonstration of the value of the electric fan in this manner and at such a time resulted in many sales that would probably never have been made.

Manner of Arranging Electrical Displays On Store Floor and in Window Has Effect on Sales

Salesmen as Well as Customers Unconsciously Suffer Depression From Poorly Arranged Stock, While Order and Cleanliness Stimulate Both

By GEORGE J. KIRKGASSER

The manner in which goods are displayed in the window space as well as the store of the contractor-dealer makes considerable difference in the volume of sales. A neatly arranged store with certain articles prominently displayed not only exerts an influence on those who enter but also has an unconscious but steady effect on the clerks and other employes. Accordingly it is well for the dealer to first put his house in order before devoting too much attention to the window display; otherwise the prospective customer will get a rude shock—a favorable impression will be created by the window display only to have it reversed by lack of order in the store.

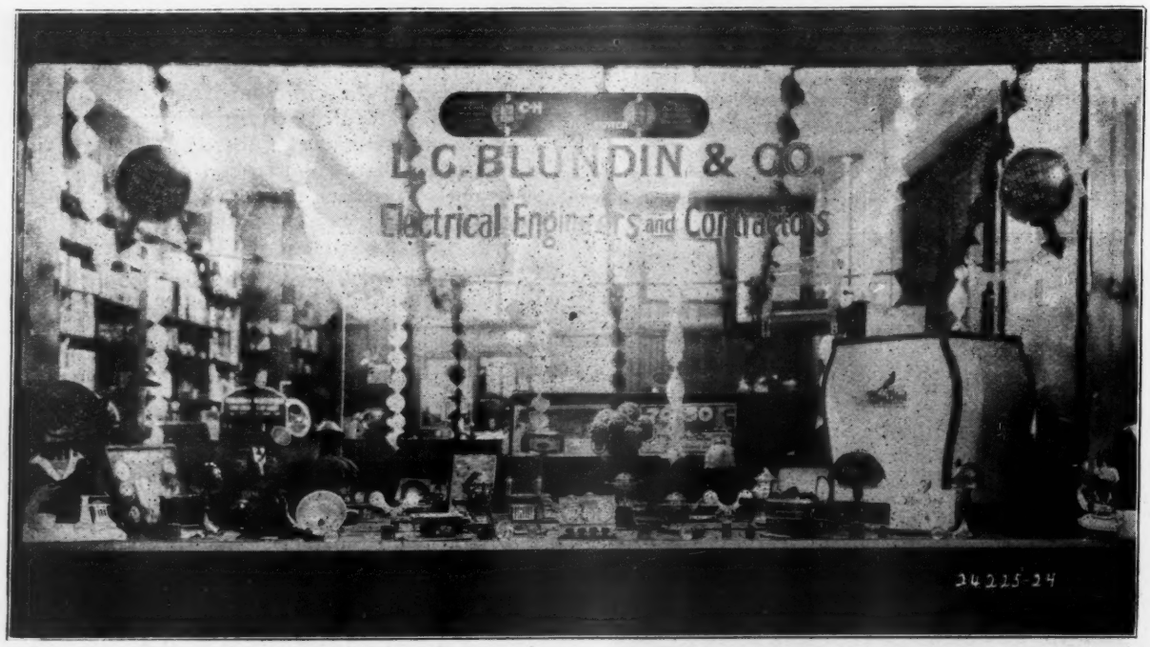
A clean and well-arranged store, with well-placed and neat shelves, means a clean, orderly clerk, one from whom it is easy to buy. Sections of counters or sections of the store should be devoted to related products. This has been frequently discussed, but it is important since such groupings should be made with a view to starting trains of thought.

A section devoted to electric washing machines should also include a display of electric flatirons, for obvious reasons. Manufacturers' posters or cut-out displays help to give atmosphere to such a section.

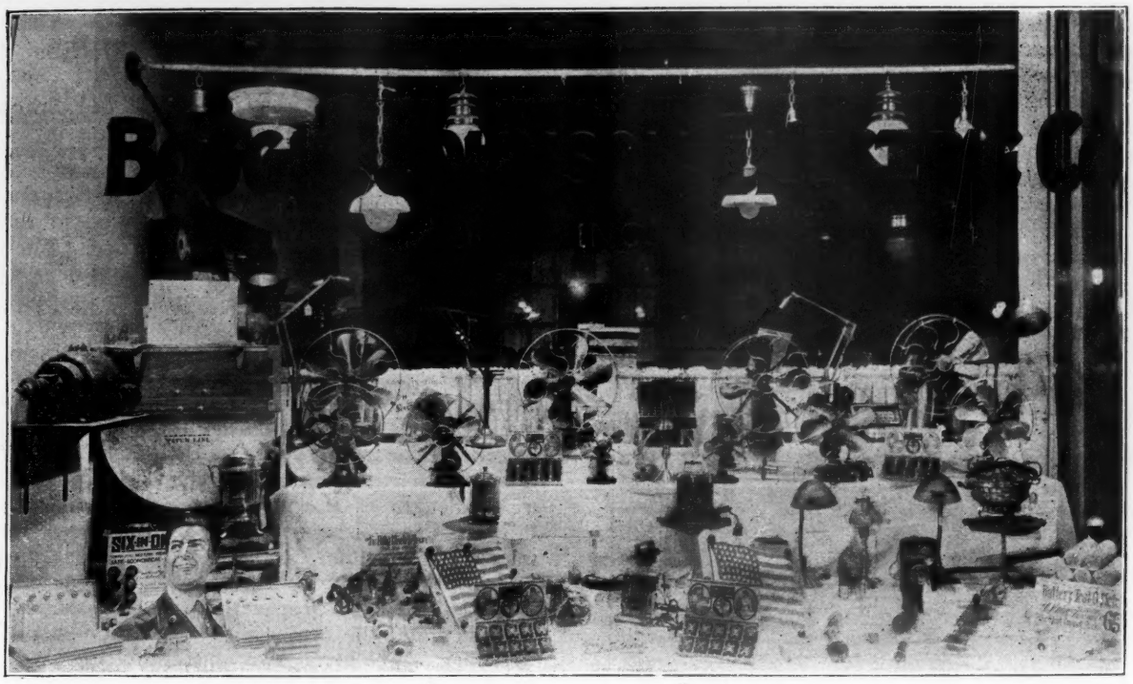
The vacuum cleaner is for use in every room and if a part of the store is available a rug, upholstered chair and draperies help to indicate the use of the cleaner and serve for demonstrating the attachments. Neatly printed display cards may be used to call attention to the joys of a clean house, the longer life of the vacuum-cleaned rug, and the ease of operation.

In the dining room, many electrical appliances are used and a "Dining Room Appliances" section would contain electric percolators, toasters, samovars, table stoves, and fans. During a special drive a dining-room scene might be made up in a window and in the store. Furniture and china can be borrowed from neighboring stores if note is made of this fact. This sort of a section helps to boost sales on other devices used with the heating appliances, such as switches for on the cords used in conveniently turning the current "on" and "off." It all helps to show customers an ideal toward which they will unconsciously work.

Articles used in bedrooms, such as heaters,



It Is Best to Display Articles That Are Related, Although This Window Trim Is Effective Because of Its Clever Arrangement.



White Backgrounds Set Off Some of the Devices in Good Fashion, but They Have the Drawback of Giving Too Much Glare.

fans, portable lamps, curling irons, vibrators, help sell each other when used to make up groups.

In all of these sections, the articles must not seem to clutter up the tables or counters, and too many different kinds of similar products should not be grouped together, for the simple reason that it raises doubt in the purchaser's mind. He or she ponders and hesitates; many questions are asked which have to be answered, and in a moment of indecision the resolution not to buy is made.

The nearer to actual surroundings in which various appliances are used the easier it is for the merchant to demonstrate the great convenience and value of his products to the prospective purchaser. While a dealer must of necessity (particularly today) carry various makes of many products to supply demand created by the manufacturer and to be sure he has stock on hand, yet it is well not to thrust too many into view.

Clean Up the Out-of-the-Way Corners and Dust-Covered Top Shelves.

Goods reposing on high top shelves and in other out-of-the-way places are hard to reach, and there is little chance of selling them. If it is dead stock it might better be removed to a storage space so as not to contaminate the live goods shown on nearby shelves. If these top shelf goods are poor sellers, it is better to arrange some sale to clean them out, to get some money out of them and to brighten up the store. As long as they remain as dead stock the money invested is drawing no interest.

Since top shelves are more or less inaccessible extra effort must be expended to see that they do not interfere with an otherwise good-looking store and detract from some specially placed merchandise.

Ideas in bringing certain articles strongly to the attention of the public can be picked up by noting methods used by high-class drug, furniture and general merchandise stores. Here we often see a combination of window and store layout such as placing the article attractively in the section of the left-hand window facing the space leading to the door. Anyone entering usually slows up here and if the same line of articles is displayed in a prominent manner at another point of advantage in the store near the entrance, attention is surely gained and more sales made. In the same way goods displayed in the main windows can be given prominent positions in the store layout in such a manner as not to conflict with the other goods being pushed.

Window Displays Establish a Store as High Grade or Otherwise.

Many stores have gained an enviable reputation because of the good taste used in window trimming. This fact attests to the value of thought given to the part of the store the public sees. And a good display sells goods.

Somewhere the writer has read about the methods used by Chinese merchants in San Francisco. One particular feature is the clever use of spots of color, because color, if used with judgment, attracts customers to a window display.

Some dealers have casings made for the rear of the windows, the casings made of fabric decorated by a commercial artist. Different seasons of the year can be typified. For instance, spring can be suggested by means of flowers, butterflies and green fields. If electric washing machines or vacuum cleaners are displayed the quicker means of doing the housework can be played up as a reason for getting out and enjoying the pleasures of springtime.

Sometimes a display of many articles may be satisfactory in the same sense that the department store advertisement is a display of hundreds of products. Generally it is better to divide the window into separate sections and use

few articles or one article in each. Articles related to each other, as in store arrangements, produce good results because one helps to sell the other. A woman may have a floor lamp, but if she sees a display in which a floor lamp and a table lamp are used attractively together the desire to have the floor lamp will be created. Even if this does not result in a sale at once a deep

These Are Well-Arranged Showcases and Cabinets, the Goods Being Protected from Dust Accumulations.

impression is made, and the store will for a long time be associated with that kind of product.

Good hand-lettered signs are a great aid in giving the onlooker more information after he has been attracted to the window display, but it is well to use only those that conform to the grade of window trim, using fewer good ones rather than more poorly executed ones.

Where a dealer does considerable contracting work also, a window trim can be made up to sell this service also. Various appliances, such as flatirons, toasters, table and floor lamps, vacuum cleaners, etc., that are almost universally known to be of unusual convenience in the home can be placed in the window with placards saying that all these comforts are possible in any home *if* it is wired for electricity.

Also when showing a corner of a dining room with electrical appliances, they should be shown connected to wall receptacles. Then a small display of such devices can be made and a sign telling how much easier and safer it is to connect appliances to receptacles than to fixtures. An estimate of the cost of installing convenient appliance outlets might be given.

Low Windows Are Found to Obtain Best Results in Display.

A big chain-store organization has made a long series of tests the results of which show that the effective window should have a floor about 18 ins. above the sidewalk level and the glass should not exceed 8 ft. in height. Space higher up cannot be used for displaying goods, and if left untrimmed does not add any value; it detracts if anything. If the window space is too deep the merchandise at the back cannot be seen well, so that 4 to 6 ft. is the maximum for good trims. Display fixtures on which articles may be shown should form a part of the window-trimming department.

FEATURING OF SHADOW-BOX DISPLAY FOR LIGHTING FIXTURES.

Electrical Contractor-Dealer With Limited Space Solves Problem by Exhibiting Fixtures in Compartments Along Wall.

Shadow boxes for display of lighting fixtures, wherever used, are proving their value in the electrical store in more ways than one. They not only permit the dealer to isolate and demonstrate a fixture without the confusion of numbers, but they conserve space in a salesroom of limited capacity.

In the store of the Mid-City Electrical Construction Co., Chicago, the shadow boxes containing the lighting fixtures are the chief feature, yet they take up but 3 ft. of the rather narrow floor space, extending approximately two-thirds of the length of the store along one wall. By utilizing the space beneath the shadow boxes for displaying vacuum cleaners, and with several tables loaded with table appliances and portable lamps occupying the space between the shadow-box case and the center aisle, the other half of the store can be given over entirely to the display of washers and other large household appliances.

The effect of such an arrangement in the Mid-City store is one of ample room rather than congestion, yet the store is only about 16 ft. wide. Because of the narrowness of the store, and in order to obtain as much window space as possible for display purposes, the street entrance has a depth of about 12 ft. and is flanked on either side with a show window the displays in which face the deep entrance rather than the street.

Recently there has been evidence of a desire on the part of many contractor-dealers to get away from the general method of displaying lighting fixtures from the ceiling. In practically every case these deviations are proving successful from the sales point of view as well as attrac-

Sometimes a General Display Can Be Attractively Arranged, Such as This One.

tiveness. It is generally acknowledged that too many varieties of decorative bowls suspended in a group, and all lighted at once, result in more or less confusion on the part of the customer in making a selection. Another result is to prolong the sales effort.

QUESTIONS AND ANSWERS

All readers are invited to submit questions and answers to this department. Anonymous communications will not be considered. Questions should relate to electrical matters of any kind. Answers contributed by readers should be submitted preferably within eight days of the date of publication of the question and should be limited, if possible, to 300 words. Payment will be made for all answers published.

Questions.

No. 496.—Meter for Rectified Current.—What kind or type of ammeter should be used to measure accurately the current delivered on the d-c. side of a mercury-arc rectifier?—H. R. G., Houston, Tex.

No. 497.—Use of Reactors on Transmission Lines.—What are the factors which govern the size of a reactor that should be installed on a transmission cable to give protection from grounds? Do reactors that are suitable for protection against short-circuits give the same degree of protection against grounds? Are reactors essential or useful on well constructed overhead lines? Can overload relays be safely eliminated on lines that are properly protected by reactors?—A. B. R., Peoria, Ill.

No. 499.—Illumination in a Barber Shop.—What intensity of illumination should be provided for the working positions in a barber shop? What is the best method of securing the proper illumination in a manner that will not cause discomfort to the person in the chair or to the barber?—N. O. C., Detroit, Mich.

No. 500.—Wattmeter Reading on Circuits of Low Power-Factor.—A description of the two-wattmeter method of testing a three-phase motor was given in the Aug. 21 issue of Electrical Review. It was stated in this article that it was fairly easy to show why one of the wattmeters reads negative at low power-factor. I would like to have someone explain or demonstrate this peculiar condition.—R. L. B., Racine, Wis.

No. 501.—Creosote Treatment of Crossarms.—Does the treatment of crossarms with creosote add anything to the safety of a 2300-volt line in case an insulator is broken allowing the bare wire to fall on the arm? Will the treatment of the pole with creosote tend to prevent a leak to ground under similar circumstances? Will the effect be different for higher or lower voltages?—V. N. H., Cedar Rapids, Ia.

Answers.

No. 492.—Load-Factor on Distribution Transformers.—What is the customary ratio of maximum load to average load carried on distribution transformers serving purely residence neighborhoods when but few appliances are in use? What is the ratio when a considerable number of appliances are fairly well distributed among the customers? What is the ratio of total kw-hr. output of such transformers to their total kw-hr. capacity when working at their maximum demand? What transformer capacity should be installed per kilowatt of total connected load for purely lighting load and for a load involving the use of appliances as well as lighting?—R. H. C., Woodland, Ill.

Answer.—The ratio of maximum load to average load for purely residential districts may be safely considered as four to one, that is for every four kw. of connected load one kw. of transformer capacity may be installed. This applies to purely lighting load, and in the writer's experience has proved an accurate estimate. The above ratio will also take care of a fair proportion of appliances of the smaller type such as irons, toasters, fans and other lamp-socket devices as such are used most at off-peak periods.

The ratio of capacity of transformer in kw-hrs. to the number of kw-hrs. consumed by lighting load is approximately ten to one. The question of the heavier appliances such as ranges, water-heating devices, etc., is not so simple, but the diversity in such cases is almost invariably very good, one case on record showing a 90-kw. connected load of ranges working satisfactorily on a 15-kw. transformer. No hard and fast rule can be laid down in any particular case as the factors vary with locality and charges made for energy, the latter governing the freedom with which lights and appliances are used.—J. S., Cumberland, B. C.

No. 494.—Operating 60-Cycle Motor on 50 Cycles.—I have a 220-volt, 1200-r.p.m., 60-cycle induction motor which I want to install on a circuit operating at 220 volts and 50 cycles. The machine is in good order and is free from grounds, having been tested out with a pressure of 750 volts between winding and core. It operates without any unusual sound and without heating at no load, but I am not certain just what would take place if the machine was put under load which will be about 7.5 hp. for a period of 10 hrs. per day. Should the motor be rewound or will it operate safely at 7.5 hp.?—H. F. W., Logansport, Ind.

Answer.—Assuming that the motor in question is rated at 10 hp., I do not think that it will heat to any dangerous extent on the lower frequency. There will be a slight increase in the amount of current consumed per horsepower owing to the decrease in speed of the motor on 50 cycles. It is stated that the motor runs at 1200 r.p.m. at 60 cycles, therefore it must be a six-pole motor and the synchronous speed at 50 cycles will be $(2 \times 60 \times f)/n = 1000$ r.p.m. As an induction motor never attains synchronous speed the actual r.p.m. will be about 980. Therefore it follows that there will be an increase in amperes consumed per horsepower owing to the decrease in speed on the lower frequency, but if the motor is installed in a well ventilated location it is believed that the heating resulting from operation on the lower frequency will not reach dangerous proportions.—J. E. J., Hempstead, N. Y.

Answer.—Assuming that the motor in question is a standard design 7.5-hp., 3-phase, 60-cycle 6-pole, 220-volt continuous-duty machine, the problem can be briefly discussed as follows: The idle current taken is not over 12 amperes, and full-load current is not over 23 amperes with a maximum temperature rise of 40 deg. C. If the performance is as good as here assumed the machine may operate on 50-cycle service with a full-load current of not to exceed 25.5 amperes. The heating will then amount to a 51 deg. C. rise in temperature, which is permissible provided the motor is not operated under overload conditions

If the motor is built for two-phase operation the idle and full-load current will be slightly smaller than here outlined, but the heating effect will be about the same. This discussion has not been checked for single-phase machines, and must not be taken for a guide to the performance of such equipment.

If information were given as to the motor design, a fairly definite answer could be given. Such information as whether the machine is built for continuous or intermittent duty, and what the temperature rise on 60-cycle service amounts to are important factors.—H. J. J., St. Louis.

No. 495.—Synchronous Motor as a Condenser.—Will someone please explain for me just how it is that a synchronous motor acts like a condenser? I have read any number of articles on the use of motors as condensers, but have never had a clear explanation given as to how such an effect is produced.—R. H. N., Peoria, Ill.

Answer.—An alternating current applied to a static condensor will repeatedly charge and discharge it. This current is known as a charging current, and it leads the applied voltage by as much as 90 deg. if capacity only is present. If the field of a synchronous motor is over excited the action is the same, that is, leading current is produced.

When induction motors are employed on a circuit, an inductive effect is produced, this is the opposite of the capacity effect. This may be partly neutralized, or balanced, by the leading current produced for this purpose. In other words, the power-factor of the system may be controlled or made to approach unity by varying the field strength of the synchronous motor.—M. K., Passaic, N. J.

BOOK REVIEWS

"Wiring for Lighting and Power." (Second edition). By Terrell Croft. New York: McGraw-Hill Book Co., Inc. Cloth, 448 pp. (5 ins. by 7.5 ins.) with 426 illustrations and numerous tables. Supplied by Electrical Review Publishing Co., Inc.

This book contains much new material aside from that published in the earlier edition. All material has been gone over and revised to conform to advances in the art and changes in the National Electrical Code. Special chapters deal with the following subjects: Generators, motors, switchboards, etc.; outside work covering all systems and voltages; inside work covering general rules, all systems and all voltages; constant-current systems; constant-potential systems; fittings and materials for all systems and voltages; miscellaneous work, including signal systems, etc., and marine work.

Quotations from the 1918 Code are reproduced in fine print, and explanatory material is given in larger type to make the distinction evident. The illustrations are well chosen, and the text is prepared and presented in a readable and clear manner. Different phases of wiring work are covered in a clear and practical manner.

"Standard Electrical Dictionary." (1920 edition.) By T. O. Sloane. New York: The Norman W. Henley Publishing Co. Cloth, 767 pp. (5 ins. by 7.25 ins.) with 477 illustrations. Supplied by Electrical Review Publishing Co., Inc., for $5.

Previous editions of this book have won for it a well-established place in the literature of science. The present edition includes new material dealing with recent advances and new developments in electrical science. The "dictionary" defines both words and terms, and gives such full and complete definitions as to partake of the form of an encyclopedia. The definition of "specific inductive capacity" takes almost two whole pages including a tabulation of the capacities of various materials. The formula used in preparing "Chatterton's compound" is given with its definition. The "electromagnet" and related items are given seven pages and a number of illustrations.

It is not possible to describe this work in a few words any more than it is possible to describe any other dictionary or encyclopedia in a limited space. The book is well printed on good paper, covers a wide variety of subjects and should have a place in the library of every person interested in electrical subjects.

"Experimental Wireless Stations." (1920 edition.) By Philip E. Edelman, New York: Norman W. Henley Publishing Co. Cloth, 392 pp. (5 ins. by 7 ins.) with 167 illustrations. Supplied by Electrical Review Publishing Co., Inc., for $3.

Theory, design, construction and operation of experimental wireless stations are treated in this book. The treatment assumes the reader to have some fundamental knowledge of both electricity and mathematics, although such knowledge need not be entirely complete. The treatment of the difficult problems is so arranged as to be easily understood by the average student.

The nature of wireless transmission is taken up in the first chapter, and diagrams are presented to show the various ideas advanced. Wave propagation, wave lengths, interfering waves and atmospheric disturbances are all briefly treated. In a chapter on "Aerials" the various types are described and illustrated. Detailed illustrations show just how joints and splices should be made, and a table and formulas show how to select or plan an aerial for a given wave length.

An illustration and descriptive matter show how a multiturn-coil directive receiver is made and used. Grounds and lightning protection are given careful treatment that is both clear and instructive. Many diagrams are used to illustrate the chapter dealing with resonance and the transmitter. These diagrams include a number of circuit connections and several wave shapes. A full-page drawing shows the detail of a complete transmitter circuit of the quenched-gap type.

Illustrations and tabulated data, together with ample descriptions, show how to construct various sizes of transformers and spark coils. The electrolytic interrupter and many other devices are described in such a manner that the careful student should be able to construct his own apparatus. Among the devices so described are an automatic antenna switch, a break-in attachment, a change-over switch, a magnetic blow-out, a large-contact key, a magnetically operated key, condensers, inductances, an oscillation transformer, several types of spark gaps, hot-wire meters, a shunt resonator and other pieces of equipment.

High-frequency alternators, vacuum valves and other devices are described and many diagrams illustrate the detail of their connections, use and construction. In addition to the material already described, entire chapters are devoted to the following subjects: The receiving station, detectors, sensitive indicators for receiving sets, tuning and interference prevention, special receiving sets, receiving condensers, construction of receiving inductances, making the wireless set work, miscellaneous applications, time and weather signals, patents, and the rights of the experimenter. This volume should be a valuable addition to the library of any experimenter or student in wireless work.

NEW APPLIANCES

Newly Developed and Improved Electrical and Mechanical Apparatus, Appliances, and Devices Now Being Placed on the Market

"Rotapex" Clothes Washer Built for Domestic Service.

After two and a half years of development and rigid tests the "Rotapex" electric clothes washer is being placed on the market by the Apex Electrical Distributing Co., Cleveland. The "Rotapex" is compact, requiring floor space of only 26.5 by 25.5 ins. It is a reversing, revolving-cylinder type of machine, the cylinder revolving 23 times a minute and reversing every five and one-half revolutions. The tank may be had in either Armco iron or copper. Simple reinforcements at the corners add strength and rigidity to the machine.

The power-operated wringer is said to be exceptionally rigid, and carries 11¾-in. rolls which are guaranteed for three years. It has an easily operated center-break safety release. Another safety feature cuts off the power while the wringer is being swung to any one of four positions in which it must be locked before the power can be applied. Ample power is furnished by a 1750-r. p. m. ¼-hp. motor, which is both inclosed and ventilated. Bronze bearings are a feature contributing to long life and reliable operation. The motor is easily started or stopped by a downward push on a large, accessible bell cap. Its operation is smooth and practically noiseless.

Automatic Projector Designed for Advertising.

Illuminated signs of various kinds are becoming more popular in the advertising of all kinds of merchandise and service. A device known as the "Automatic Balopticon," which automatically displays 68 different slides of any desired picture or reading matter, is being marketed by the Automatic Illuminated Advertising Corp., Baltimore.

The screen used for regular display is 20 by 20 ins., and slides are changed each ten seconds. However, manual control may be used if desired, and the pictures can be projected onto a screen ten feet square.

Arc Lamp Suitable for Various Photographic Uses.

A twin-arc lamp, said to produce a white flame, is being manufactured by J. H. Wagenhorst & Co., Youngstown, O. This lamp may be used for making blueprints, copper and zinc plates, portrait proofs and in copy work. A rheostat and control unit is assembled as a separate part for installation where convenient.

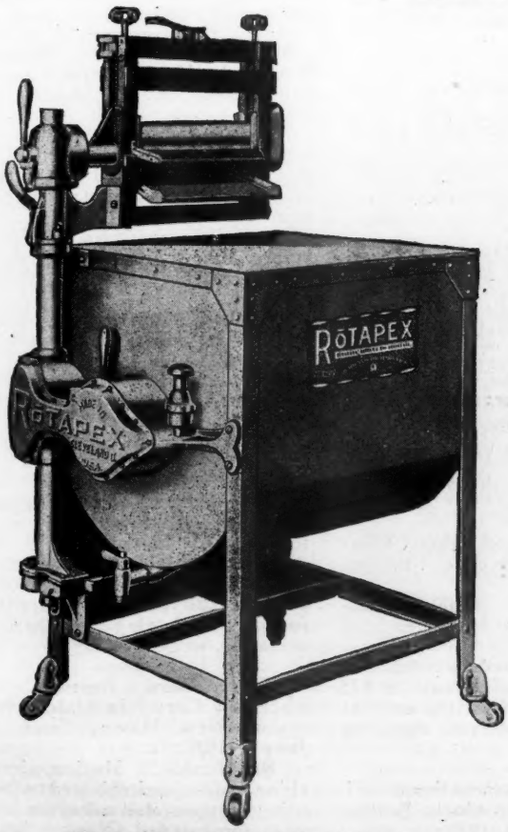
Either a-c. or d-c. service may be used at 110 or 220 volts. Portable stands and reflectors adapt the lamp to its particular use.

Conover Devices Improve Electric Dishwashing Machine.

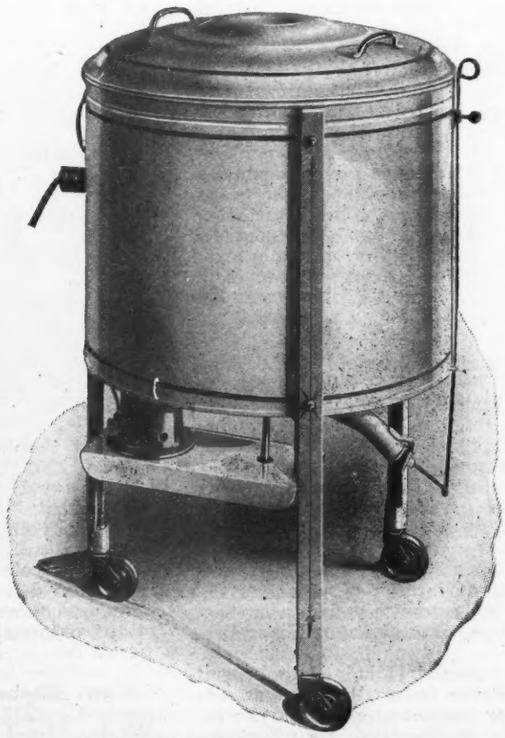
One of the features of the electric dishwasher manufactured by the Conover Manufacturing Co., 4555 Ravenswood avenue, Chicago, is a turbine-like device for forcing the water over the dishes. The spiral flanges on the device terminate in two fan-like blades. These flanges elevate the water and the blades, whirling with great velocity, hurl the streams upon and around every dish, according to the statement of the manufacturer. Since boiling water may be introduced into the reservoir of the dishwasher without danger of breaking the glassware or crockery, they are assured full sterilization and cleansing.

Large rubber-tired, ball-bearing casters are provided for the three legs of the machine so that it may be trundled into the dining room and the dishes placed in it direct from the table. The weight of the machine is 40 lbs. and it occupies about the floor space of an ordinary chair. The capacity is such that the dishes from two or three meals may be stacked therein and washed at one time. Features of construction are intended to prevent the escape of odors.

Non-corrosive and non-rusting materials are used in the construction of the machine, all fittings being of nickel, while the container and legs are finished in heavy enamel baked on. The inside of the container is smooth and no refuse can accumulate and form unpleasant odors. The machine is self-cleaning.



"Rotapex" Electric Clothes Washer.



Conover Dishwashing Machine.

LATEST APPROVED APPLIANCES

Approved by Underwriters' Laboratories, Following Examination and Tests Conducted Under the Standards of the National Electrical Code

Automatic Switches, Magnetically Operated Type—Hart Manufacturing Co., Hartford, Conn. Listed June 4, 1920.

"Diamond H." Automatic switch consisting of laminated brush contacts actuated by solenoid, circuit of which is controlled by push-button switches located at remote point. 25-100 amperes, 250 volts, Type F.

Cabinets and Cutout Boxes, Sheet Metal—Cregier Electrical Manufacturing Co., 220 West Ontario street, Chicago. Listed July 2, 1920.

Cable, Armored—Circle Flexible Conduit Co., Inc., 188 21st street, Brooklyn, N. Y. Listed June 15, 1920.

Marking: Letter "O" stamped in armor at intervals of about 3 ins.

Cable, Armored—A. Dewes Manufacturing Co., 199 Lafayette street, New York, N. Y. Listed June 15, 1920.

Marking: Letter "D" in circle stamped in armor at intervals of about 4.5 ins.

Cord, Flexible—Philadelphia Insulated Wire Co., 200 N. Third street, Philadelphia. Listed June 9, 1920.

Marking: Red, white and blue cotton thread cabled with copper strands.

Ground Clamps — Gillette-Vibber Co., New London, Conn. Listed June 18, 1920.

For use with 3-in. rigid conduit or less. "Gee-Vee." Catalog Nos. 61-63.

Heaters, Electric—Rand Electric Co., 849 Third avenue, New York, N. Y. Listed July 2, 1920.

Permanent hair-waving machine consisting of tubular heating units, suspended by cords and counterbalance weights from the canopy of a fixture, in the arms of which are mounted attachment plug receptacles, to receive the attachment plug caps, located on the ends of cords attached to the heating units. Designed for permanent installation on ceilings and for placing a permanent wave in ladies' hair. 7 and 8.5 amperes, 100-125 volts.

Insulating Materials — Diamond State Fibre Co., Bridgeport, Pa. Listed June 29, 1920.

Insulating material, sheets, tubes, and rods, having the following properties: Good dielectric strength; excellent mechanical strength; slightly absorptive; readily worked with tools; not strictly non-combustible; slightly affected by temperatures of 300 degrees. C.; unaffected by acids and oils; practically neutral. "Condensite Celoron." Asbestos base, Canvas base, Fiber base, natural color, Fiber base, black.

This material is judged to be suitable for use in small pieces as supports for current-carrying parts when properly inclosed or protected and when use of strictly non-combustible material is not practicable. Manufacturers desiring to use this material should submit samples in commercial form for examination and test by Underwriters' Laboratories.

Lamps, Arc.—M. J. Wohl & Co., 207 Fulton street, Brooklyn, N. Y. Listed June 11, 1920.

"Duplex" photo-studio lamp; consists of two sets of carbons connected in series, inclosed in a sheet-metal case having a woven glass diffuser; 25 amperes, 110 volts, direct current.

Outlet, Bushings and Fittings.—Thomas & Betts, 63 Vesey street, New York City. Listed May 18, 1920.

"Standard" connectors for armored cables; catalog No. 280.

Panelboards.—The Spero Electrical Manufacturing Co., 33rd street and Woodland avenue, Cleveland. Listed May 24, 1920.

Consisting of an assembly of buss bars, with or without standard cutout parts, or with or without switches mounted on insulating bases; designed for use on low-potential circuits.

Receptacles for Attachment Plugs and Plugs.—Benjamin Electric Manufacturing Co., 120 South Sangamon street, Chicago. Listed May 17, 1920.

"Benjamin." 20 amperes, 125 volts; 10 amperes, 250 volts; catalog Nos. 7681-82 and 7684; 20-ampere plug, catalog No. 7683.

Receptacles for Attachment Plugs and Plugs.—Delta-Star Electric Co., 2423 Fulton street, Chicago. Listed May 28, 1920.

"Delta-Star." 100 amperes, 600 volts; receptacles, catalog No. 2355; plugs, catalog No. 2356.

Receptacles for Attachment Plugs and Plugs.—Universal Electric Stage Lighting Co., 240 West 50th street, New York City. Listed May 3, 1920.

"Kliegl." 50 amperes, 125 volts; catalog No. 965.

Receptacles, Medium Base.—The Bryant Electric Co., Bridgeport, Conn. Listed June 4, 1920.

Receptacle handles for medium base receptacles without shells; catalog Nos. 591-92.

Signal Appliances.—Amrevo Electric Co., 2309 Archer avenue, Chicago. Listed May 21, 1920.

"Signalrite." Type A-100; 4 amperes, 125 volts; device on principle of induction coil controlled by relay in dry-cell circuit designed to take current from d-c. lighting circuit at 125 volts, and to supply pulsating current at approximately 20 volts to signaling circuit.

Sign Flasher.—International Finance Co., 310 Pacific block, Seattle, Wash. Listed June 4, 1920.

Magnetic sign flasher consisting of solenoid-operated switch and control circuits mounted on slate panel and inclosed in metal box; for use on a-c. circuits; 100-125 volts 20 amperes, 60 cycles.

Signs.—Hi-Glo Sign Co., Schmulbach building, Wheeling, W. Va. Listed June 18, 1920.

Electrically illuminated display signs for general use.

Signs.—R. & H. Strachan, Inc., 395 Fulton street, Brooklyn, N. Y. Listed June 8, 1920.

Electrically illuminated signs for general use.

Sockets, Medium Base.—Continental Electrical Products Co., 30 North La Salle street, Chicago. Listed June 11, 1920.

"Cuthbert" metal shell medium base sockets, key and keyless electrolier type, designed for attachment to unthreaded fixture systems by a steel clamping collar and knurled bushing threaded on socket nozzle; 250 watts, 250 volts.

Sockets, Medium Base. — Hemco Electric Manufacturing Co., 344 East 40th street, New York City. Listed May 28, 1920.

"Hemco" weatherproof, composition medium base sockets; keyless, 660 watts, 600 volts.

Switches, Automatic, Magnetically Operated. — General Electric Co., Schenectady, N. Y. Listed June 4, 1920.

"G. E." automatic switches consisting of a triple-pole; type CR-7002, magnetically-operated switch mounted in a sheet-steel cabinet; with time-element fuses, 2 hp., 110 volts; 5 hp., 220, 440 and 550 volts; type CR-7005; with inverse time-limit overload relay, ¼-35 hp., 110, 220, 440 and 550 volts; type CR-7006.

Switches, Combination Snap and Fuse.—The Hart Manufacturing Co., Hartford, Conn. Listed June 2, 1920.

"Diamond H." Double-pole, series-multiple, snap switch combined with plug-type fuse base; for use only in electric ranges; 20 amperes, 125 volts; catalog No. 1921.

Transformers, Bell-Ringing.—The States Co., 72 Francis avenue, Hartford, Conn. Listed May 18, 1920.

"Alert;" air-cooled transformers designed to supply current at 60 cycles, primary 110 volts, secondary 10 volts; for use only in ringing bells or similar signaling work.

Wires, Slow Burning. — Marlin-Rockwell Corp., Insulated Wire Division, New Haven, Conn. Listed June 4, 1920.

"Rockbestos." Motion picture machine cable, switchboard wire, stove wire; compounded asbestos insulation and compounded asbestos braid.

ACTIVITIES IN THE TRADE

Business Developments, Sales Agencies, Trade Literature and Miscellaneous Items Concerning Electrical Manufacturers and Allied Business Interests

Rock Light Co., Long Island City, N. Y., has filed notice of increase in capital from $5000 to $50,000 for proposed expansion.

Metropolitan Electrical Supply Co. has leased property at 45 North Seventh street, Philadelphia, for a term of years for a branch establishment.

Walter S. Edmands, electrical contractor, has removed to larger quarters at 21-27 Pearl street, Boston, in order to take care of increased business.

Black & Decker Manufacturing Co., Towson, Md., manufacturer of electrically operated tools and equipment, has increased its capital from $350,000 to $2,000,000 for proposed expansion.

Hercules Electric Co., Cleveland, has been sold to Charles G. McCutcheon and associates, who plan extensive additions and improvements to the plant for the manufacture of electrical apparatus.

Brantford Washing Machine Co. has been incorporated at Brantford, Ont., to manufacture electric washing machines and other appliances. The capitalization is $100,000 and Robert A. Lyons and Stephen A. Jones are the incorporators.

Apex Electric Distributing Co., Cleveland, has announced a new $5000 prize sales contest for Apex cleaner salesmen, to close Sept. 25. Only the distributor's wholesale and retail salesmen are eligible to compete. The prizes and bonuses are listed in three divisions for the wholesale men and in two divisions for the retail men.

Kliegl Brothers, 240 West Fiftieth street, New York City, manufacturers of special electric lighting devices, have acquired property on West Fiftieth street, near Eighth avenue, in the vicinity of its present plant, for the erection of a four-story factory. The company will remove its present works to the new location on the completion of the new building.

George Cutter Works of the Westinghouse Electric & Manufacturing Co., South Bend, Ind., is making extensions which will double its manufacturing capacity. These extensions include a new foundry space of 64 by 112 ft., and a second floor measuring 66 by 250 ft., for assembling and storage rooms. In addition, outdoor storage space has been obtained which will greatly increase the facilities.

Uehling Instrument Co., 71 Broadway, New York City, manufacturer of fuel economy equipment, announces that it is now represented in the New England states by the Smith Engineering & Supply Co., 89 State street, Boston, manufacturers' agent and engineer, specializing in power-plant equipment. S. W. Smith, president of the latter company, was until very recently asociated with the Uehling Instrument Co., with headquarters in the New York office.

Varney Electric Co., Evansville, Ind., jobbers in electrical supplies, sustained a loss of more than $100,000 by fire recently.

Pyramid Motor Equipment Co., New York City, has filed notice of increase in capital from $15,000 to $50,000 for proposed expansion.

Kleinschmidt Electric Co., Inc., 36 Flatbush avenue extension, Brooklyn, N. Y., manufacturer of electrical products, has increased its capital from $100,000 to $500,000 for proposed expansion.

Westinghouse Electric & Manufacturing Co. employes, their wives and families, numbering over 40,000 persons, attended the thirty-fourth annual

Annual Outing of Westinghouse Employes.

outing and basket picnic at Kennywood Park, Pittsburgh, Pa., on Aug. 14. This outing was featured by athletic events participated in by both men and women of the company, an event that created considerable interest being a baseball game between teams composed entirely of girls. The success of the picnic was due entirely to the efforts of the employes of the company, who had complete charge of all arrangements. The various units included in the plans for the outing consisted of the electric, machine and meter works, East Pittsburgh; Trafford City works; Linhart and copper mill at Turtle Creek; Homewood service station and Pittsburgh office, and Braddock foundry, Braddock, Pa.

Safety Car Heating & Lighting Co., Jersey City, N. J., manufacturer of electric equipment for railroad service, will have improvements and extensions made at once in the former local plant of the Marlin-Rockwell Co., recently acquired. The company is planning the removal of its Jersey City works to New Haven in the early fall.

Leeds & Northrup Co., 4901 Stenton avenue, Philadelphia, Pa., manufacturer of electrical measuring instruments, has taken title to property totaling about three acres on Germantown avenue, for the erection of an addition to its plant. The consideration is stated at $35,000. Plans for the proposed plant are now being prepared.

Northwestern Electric Equipment Co., 35 Vestry street, New York City, has filed notice of increase in capital from $10,000 to $200,000.

International Radio Telegraph Co., Pittsburgh, Pa., a Delaware corporation, manufacturer of radio apparatus, has filed notice of change of name to the International Devices Co.

Landers, Frary & Clark, Ellis street, New Britain, Conn., manufacturer of electric heating and cooking equipment, etc., is completing plans for the erection of three-story addition, 60 by 210 ft., to its factory.

Cutler - Hammer Manufacturing Co.'s New York office employes held their annual outing July 17 at Rye Beach Inn, 26 miles from the metropolis on the Sound. The day's program included athletic events, outdoor games and dancing.

General Electric Co. has filed plans for the erection of a one-story building at the Government plant at Columbia avenue and Putnam street, Baltimore, Md., recently acquired. The plant will be used for the manufacture of electric switches and other specialties.

W. J. Rainey, Inc., 52 Vanderbilt avenue, New York City, has been organized to carry on the business heretofore conducted under the name of W. J. Rainey, engineer. L. L. Willard, a member of the American Institute of Electrical Engineers, is a vice-president of the company.

Peerless Light Co., Chicago and New York, is sending out a pre-catalog flyer covering some of its prominent specialties such as chandeliers and glassware. The ground is well covered and the illustrations and descriptive matter are arranged as to convey full information concerning the articles mentioned.

Illinois Testing Laboratories, Inc., 430 South Green street, Chicago, has issued a bulletin describing the service rendered to central-station companies, contractor-dealers, industrial and isolated plants, etc. The laboratories repair and test meters and instruments of every make and type, both at the laboratories and at the plants of its customers. A specialty is made of building new and special types of electrical measuring apparatus.

Charles T. Main, engineer, 201 Devonshire street, Boston, has issued a 32-page booklet, 8.5 by 10 ins., entitled "Hydroelectric Developments," the purpose of which is to show in part the work of the Charles T. Main organization in the design and supervision of water-power structures and hydroelectric systems varying from the small plant to that of the first magnitude. Photographic reproductions showing work acomplished are presented, together with brief descriptions of the plants and special features connected with them.

PERSONAL MENTION

Biographical Sketches and Chronicle of Changes in Business Connections, Promotions and Other Personal News of the Industry

EDMOND S. TURNER has joined the engineering department as estimator of the Pacific Power & Light Co., Portland, Ore.

F. G. SYKES, vice-president of the American Power & Light Co., New York City, was a visitor in Portland, Ore., last month, going from that point to Wichita, Kan.

FRANK A. LEACH has been appointed assistant general manager of the Pacific Gas & Electric Co., San Francisco. He was formerly manager of the Alameda district.

CHARLES H. AVERY has resigned his position with the V. V. Fittings Co., Philadelphia, to become manager of sales and purchases for the Holt Electric Co., Jacksonville, Fla.

CLOYD M. CHAPMAN has severed his connection with Dwight P. Robinson & Co., Inc., and opened an office at 171 Madison avenue, New York City, as a consulting engineer.

EARL FISHER, formerly assistant manager of the commercial department of the Pacific Gas & Electric Co., San Francisco, has been promoted to the position of manager of that department.

HARLOW C. CLARK has become connected with the Public Service Corp., Newark, N. J., in the public relations department, covering railway, electric service and gas interests of the corporation.

EDWARD W. HARRY, formerly connected with the electrical department of the National Tube Co., Pittsburgh, Pa., has become chief electrical engineer for the Pittsburgh Steel Co., Monessen, Pa.

W. S. FINLAY, JR., has resigned as superintendent of motive power of the Interborough Rapid Transit Co., New York City, to accept the position of vice-president of the American Water Works & Electric Co.

J. R. WERTH has resigned as major from the construction division of the United States Army and has opened an office at 6823 Thomas street, Pittsburgh, Pa., for furnishing technical advisory reports to electrical and industrial corporations.

J. V. STRANGE, assistant general manager of the Pacific Power & Light Co., Portland, Ore., was in Seattle last month attending a meeting of the governing committee of the commercial section of the Northwest Electric Light & Power Association, of which he is a member.

FRANK G. DRUM has resigned from the presidency of the Pacific Gas & Electric Co., San Francisco, after being an officer of the company for 15 years. He will still be connected with the company as a director and a member of the executive committee. Mr. Drum, in resigning, gave as his reason the pressure of business affairs. Wiggington E. Creed, attorney, president of the Hooper Lumber Co., as well as of the East Bay Water Co., was elected to the position made vacant by the resignation of Mr. Drum. Mr. Creed has had a wide experience in the utility field. He reorganiezd the People's Water Co., of Oakland, Cal., and formed the Columbia Steel Co., of Pittsburg, Cal.

J. E. WILSON, state secretary of the Massachusetts State Association of Electrical Contractors and Dealers, has been connected with the electrical industry in Boston practically all his life, his first work having been in 1879 as night operator for the Telephone Dispatch, which afterward became the New England Telephone & Telegraph Co. Later

J. E. Wilson.

he accepted a position with the Financial Telegram Co., a corporation that furnished stock quotations in opposition to the Gold & Stock Ticker Co. In 1889 Mr. Wilson became a traveling representative for the Pettingell-Andrews Co., Boston, traveling through New England and New York state. Later he was connected in the same capacity with the Stuart-Howland Co., Boston, and with F. S. Hardy & Co., Boston, representing these concerns in New York state and eastern Pennsylvania. He has been state secretary of the Massachusetts Association since 1916 and is also secretary of the Boston section of the association and secretary and treasurer of the electric section of the Boston Building Trades Employers' Association.

IRVING E. MOULTROP, chairman of the Boston section of the American Institute of Electrical Engineers, was recently elected by the trustees of the United Engineering Society to fill the vacancy on the board caused by the death of E. Gybbon Spilsbury, one of the trustees representing the American Society of Mechanical Engineers.

CHARLES O. RAUSCHKOLB has been put in charge of a new sales office and service station of the Wegner Electrical Manufacturing Co., at 2007 South Ervay street, Dallas, Tex.

E. W. HENDERSON, associate professor of electrical engineering of Queen's University, has resigned to accept a position in the engineering department of the Canadian Crocker-Wheeler Co., St. Catharines, Ont.

CHARLES F. KETTERING, president of the Delco Light Co., Dayton, O., was elected president of the Engineering Club of Dayton at the recent annual meeting of that body. Mr. Kettering is a fellow of the American Institute of Electrical Engineers.

CLIFFORD S. MACCALLA has resigned as general manager of the Rochester (N. Y.) plant of the General Electric Co., and has been succeeded by Frank A. Haughton. Mr. MacCalla has become vice-president and general manager of the Virginia Power Co., Charleston, W. Va.

FRANK F. BOYD, Lt.-Com. U. S. N. R. F., who served during the war as senior engineer officer of the U. S. S. Jupiter and later as engineer and repair officer at the U. S. submarine base at New London, Conn., is now assisting in handling the work of the marine division which the Westinghouse Electric & Manufacturing Co. has recently established in its sales office in New York City.

OBITUARY.

WARREN C. ROMINE, salesman for the National Electric & Auto Supply Co., Peoria, Ill., was drowned recently in the Illinois river at Mossville, a few miles north of Peoria.

W. L. GEORGE, a member of the Portland (Ore.) accounting office force of the Pacific Power & Light Co., died last month at the age of 35 years. He became associated with the Portland Gas & Coke Co. in May, 1918, having resigned from the employ of the San Diego Gas & Electric Co. In March of the following year he accepted a position as bookkeeper with the Pacific company at Portland, which he held at the time of his death.

FRANCIS W. THROOP, who was hydraulic engineer with the Empresa Electricas Asociados, Lima, Peru, died recently at Chosica, near Lima, as the result of an accident. He graduated from Cornell University in 1892 and on leaving college was employed by the General Electric Co., Pittsburgh Reduction Co., and other firms. In 1908 he became power house superintendent for the Ft. Hamilton Cataract Power, Light & Traction Co., at Hamilton, Ont., and in 1918 he became connected with the Empresa people in Peru. Mr. Throop was elected to the grade of associate in the American Institute of Electrical Engineers in 1909.

BUSINESS OPPORTUNITIES

News of Electrical Construction Projects in All Parts of the Country, Proposals Invited, Foreign Trade Openings and New Companies

EASTERN STATES.

Boston, Mass.—New England Telephone & Telegraph Co., 50 Oliver street, has construction under way on a three-story exchange and business building, 65 by 180 ft., at Adams, Monticello and Robinson streets, to cost about $700,000.

Bridgeport, Conn.—Electric Illuminating Co. has awarded a contract to Casey & Hurley, 120 Pequonnock street, for the erection of the superstructure of its proposed power plant on Pembroke street, foundation work for which is under way. It is estimated to cost about $3,000,000, including equipment.

Bridgeport, Conn. — Bridgeport Brass Co., East Main street, is taking bids for the erection of a one-story power house to cost about $10,000.

Middletown, Conn.—Goodyear Rubber Co. has completed plans for the erection of a power house, 30 by 40 ft., for general works service. Buck & Sheldon, Inc., 60 Prospect street, Hartford, Conn., is the architect.

New Haven, Conn.—Electrical and mechanical equipment will be installed in the repair shops to be erected by the New York, New Haven & Hartford railroad at its Cedar Hill shops. A large machine shop will be erected and with extensions to present buildings about 12,000 sq. ft. of additional space will be provided. Cranes and a new heating plant will be installed. The entire work is estimated to cost about $150,000.

New Haven, Conn.—United Illuminating Co. has awarded a building contract to C. W. Murdock, Inc., New Haven, for the erection of an addition to its electric power plant on Grand avenue to cost about $100,000. It is planned to start construction at once.

Torrington, Conn.—Warner Brothers have filed plans for the erection of a one-story addition to the power house at their corset manufacturing plant.

Ayden, N. Y.—The town council has preliminary plans under way for the installation of an electric street-lighting system. J. K. Quinerly is clerk.

Buffalo, N. Y.—Active work is being inaugurated in connection with the proposed plans of the city commission for the establishment of a municipal electric light and power plant. F. W. Ballard, electrical engineer, Cleveland, is conferring with the city in regard to the project. Commissioner Graves is active in the work.

Buffalo, N. Y.—Buffalo General Electric Co. has awarded a contract to Huntley & Derdenger, Electric building, for the erection of the proposed addition to its substation, 37 by 40 ft.

Ellenville, N. Y.—Charles P. Dickinson and associates are planning for the erection of an electric power plant at Ulster, N. Y.

New York, N. Y.—Electric Bond & Share Co., 71 Broadway, has disposed of a bond issue of $1,000,000 for the Pacific Power & Light Co., Portland, Ore., one of the companies which it operates. A portion of the proceeds will be used for extensions and improvements in plants and system.

New York, N. Y.—New York Edison Co. has taken a contract from the Munson Steamship Co. for light and power service at its new 25-story office building, to be located at Wall and William streets. The structure will require 3600 lamps for illumination and 400 hp. in motors for operation of elevators, pumps and other apparatus.

New York, N. Y.—Electric traveling cranes, electric-operated hoisting and conveying machinery for freight service, etc., will be installed on the piers to be constructed by the city on the Hudson river, to replace a number of old structures. A total of 18 piers will be built, ranging in length from 950 to 1025 ft.; two of the piers will be 100 ft wide, seven, 150 ft., and nine, 125 ft. The structures are estimated to cost $50,000,000, with equipment and a fund of this amount has been approved by the sinking fund commission. The work will be in charge of Murray Hulbert, commissioner of docks.

New York, N. Y.—Kawakita Electric Corp. has arranged for a reduction in its operating capital from $200,000 to $100,000.

Tonawanda, N. Y.—The city council has arranged for extensive improvements at the municipal waterworks and pumping station, to include the installation of three new boilers and auxiliary operating machinery.

Yonkers, N. Y.—The New York Edison Co. has filed plans for the erection of a one-story transformer station on Bennett place, near Dunwoodie avenue, to cost about $40,000.

Camden, N. J.—West Jersey Paper Co. has completed plans for the installation of a pumping plant at its works, Front and Elm streets, about 28 by 45 ft.

Madison, N. J.—With a view to placing the local municipal electric light and power plant on a better financial basis, allowing funds for improvement work, the borough council is considering an advance in service rates. Harry Terry, plant superintendent, has been ordered to conduct an investigation of costs and report at the next meeting of the council.

Newark, N. J.—The city commission has inaugurated preliminary work relative to the establishment of a municipal electric light and power plant, to be operated in conjunction with the city waterworks, and utilizing the head of water at one of the various waterworks sites. It is proposed to obtain estimates of cost and details of plant, and submit the proposition with suitable bond issue to voters at the coming fall election.

Newark, N. J.—Public Service Electric Co. has filed plans for the erection of an addition to its forge shop at the foot of Center street.

Newark, N. J.—Celluloid Co. will make improvements in the power house at its plant at 24 Niagara street, including the construction of a 225-ft. brick stack to cost about $15,000.

Newark, N. J.—A power house for works service will be erected by John Ebersberger, operating a cooperage works at Paris street and Wilson avenue, in connection with his plant to be located on property recently acquired at Passaic avenue and Blanchard street.

Trenton, N. J.—The Department of Architecture, 142 West State street, will receive bids up to Sept. 14, for electrical, heating and other work for the new state normal school at Glassboro. Francis H. Bent is state architect.

Altoona, Pa.—The Penn Central Light & Power Co. has filed application with the Public Service Commission for permission to issue stock for $2,692,500, the proceeds to be used in part for proposed extensions and improvements.

Blossberg, Pa.—Plans have been completed by the Blossberg hospital for the erection of a one-story power plant and mechanical laundry plant at the institution.

Ford City, Pa.—The borough council has completed plans for extensions and improvements in its municipal power plant, used in connection with the borough waterworks. The addition will be one story, 40 by 50 ft.

Glen Rock, Pa.—Glen Rock Electric Light & Power Co. has completed the erection of an ice-manufacturing plant to be operated in connection with its other utilities.

Harrisburg, Pa.—The Philadelphia Suburban Gas & Electric Co., Philadelphia, has filed application with the Public Service Commission for permission to merge a number of utility companies in eastern Pennsylvania counties into its system. These include the following companies: Charlestown Township Electric, Schuylkill Township Electric, Thornbury Light, West Pikeland Electric, West Bradford Township Electric, New Britain Electric, Ambler Electric Light, Warrington Township Electric Co., and other smaller organizations, totaling 19 in all.

Lewiston, Pa.—The Mifflin County Directors of the Poor will receive bids until Sept. 14 for electrical equipment to be installed at the county home. All former oil or other lighting fix-

tures will be replaced with electric service.

Philadelphia, Pa.—The Metropolitan Electrical Supply Co. has leased space at 45 North 7th street for a new local establishment.

Philadelphia, Pa.—Philadelphia Electric Co. has leased the present plant of the Vim Motor Truck Co., Market and 23rd streets, comprising a six-story, reinforced-concrete building, 250 by 400 ft. The company will take possession in December when the Vim company will remove to a new plant at Nicetown. The electric company will use the structure in connection with its mechanical and operating departments.

Philadelphia, Pa.—Bids have been taken by the Ferguson Carpet Co., Germantown, for building erection for the proposed power plant at its factory.

Philadelphia, Pa. — Blumenthal Brothers, James and Margaret streets, have filed plans for the erection of a power plant for works service at their cocoa factory.

Philadelphia, Pa.—The Pennsylvania Railroad Co. has had plans prepared for the erection of an addition to its substation at Arsenal Bridge. Improvements will also be made in the present plant.

Port Allegany, Pa.—The borough council has arranged for a bond issue for the construction and operation of a municipal electric light and power plant.

Reading, Pa.—A large electric power plant will be erected by Dives, Pomeroy & Stewart in connection with the proposed addition to their department store. The structure will be seven stories, 60 by 270 ft., located at Sixth and Cortlandt streets, and is estimated to cost about $500,000.

Tyrone, Pa.—The borough council has filed complaint with the Public Service Commission against the Home Electric Light & Steam Heating Co., in regard to increased charges made for street-lighting service, advanced from $50 to $66.50, in spite of existing five-year contract.

Williamsport, Pa.—Lycoming Edison Co. has made application to the Public Service Commission, for the permission to issue notes for $123,000, the proceeds to be used in part for proposed extensions and betterments.

York Haven, Pa.—York Haven Power Co. has completed the construction of a high-tension line to a connection with the system of the Metropolitan Edison Co., Reading, at Annville, about 28 miles. The line is designed for emergency service, to be used by both companies.

Baltimore, Md.—Considerable electrical and mechanical equipment will be installed in the plant to be erected by the Coca-Cola Co., Atlanta, Ga., at Fort avenue, near Lawrence street, Baltimore. The factory will be four stories, 190 by 600 ft., and is estimated to cost $1,000,000, including machinery. The Arthur Tufts Co., Lexington building, Baltimore, is the contractor. S. L. Willard is resident manager.

Baltimore, Md.—Plans for the erection of a two-story power house, 60 by 66 ft., to cost about $45,000. have been filed by the Prudential Oil Co. The plant will be located at its works at Third street and Fifth avenue.

Baltimore, Md.—The water department is completing the installation of an electrically operated centrifugal pump at the Mount Royal pumping station to cost about $100,000. The pump will have a capacity of 35,000,000 gals. in 24 hrs. The department is planning the installation of a pumping unit at the Eastern pumping station, and has an appropriation of $45,000 available for this purpose.

Baltimore, Md.—Consolidated Gas, Electric Light & Power Co., Lexington building, has awarded a contract to the McLean Contracting Co., Fidelity building, for the erection of a one-story substation at Port Covington.

Bedford, Va.—The city council has completed plans for the erection of an hydroelectric power plant at Snowden, to serve as an extension to the present station now located at this point.

Danville, Va.—Riverside & Dan River Cotton Mills have completed arrangements for the erection of a power plant on a local site, to cost about $100,000. The plant will be used for general factory service.

Richmond, Va.—The R. J. Reynolds Tobacco Co., Winston-Salem, N. C., has completed plans for the erection of a one-story power plant here.

Oak Ridge, N. C.—Oak Ridge Light & Power Co., recently organized, has concluded arrangements with the Southern Power Co., Charlotte, N. C., for power supply. The compny will establish a local substation and distributing system. D. L. Donnell is president.

Camilla, Ga.—The city will obtain electric power for street lighting purposes from the Baker County Power Co.

Smyrna, Fla.—The city council is planning the erection of a municipal electric light and power plant. A bond issue will be voted at an early date.

NORTH CENTRAL STATES.

Carey, O.—The council will offer for sale bonds for building electric light plant. Address village clerk.

Cheboygan, Mich.—With operating expenses of the city water works constantly increasing the members of the city council held a meeting to take up the proposition with F. B. Spencer of the Cheboygn Electric Light & Power Co. with view of operating the plant with electric power.

Cheboygan, Mich.—The city council is considering a plan to install electrical machinery for the operation of the waterworks.

Detroit, Mich.—The street railway commission notified the city council that it is willing to construct the Elizabeth street traction loop proposed recently by the Detroit United Railways, and allow the street car company to operate its cars on the loop.

Owosso, Mich.—The city commission decided to reject the only two bids received for the contract for installing boulevard lighting system, and advertised for new bids. One bid was for $40,000 and the other $44,000. The estimated cost of the work as prepared by Professor Parker of the University of Michigan was $32,000.

Traverse City, Mich.—The city has voted $75,000 in bonds to install a steam plant to generate electrical power and act as an auxiliary to the hydroelectric plant. The steam plant will have a capacity of 1300 hp.

Anderson, Ind.—An order from the Public Service Commission of Indiana has been received whereby the Board of Works is permitted to spend $230,000 on the city light plant improvements at this time.

Columbus, Ind.—The county commissioners have agreed to install electric lights on the 17th street bridge over Haw Creek. Bids for the work will be received Sept. 7.

Vincennes, Ind.—Preliminary steps looking to the construction of a new municipal electric works were practically completed when the city council awarded the building contract to John H. Kretz of Washington for $26,000.

Centralia, Ill.—At the meeting of the council the "white way" was discussed and the mayor maintained that if the cost of installation was not too great that the West side "white way" should begin on Beech street.

Galesburg, Ill.—At a meeting of the electric light committee in the mayor's office it was decided to proceed with the reconstruction and rehabilitation of the city's electric light system, as outlined in a statement recently made by members of the committee. The work will be done under the direction of Mr. True.

Moline, Ill.—The United Light & Power Co., organized in East Moline Feb. 2, 1908, and later purchased by the Tri-City Railway & Light Co., has been dissolved and its charter surrendered. The same action has been taken by the Watch Tower & Campbell's Island Park Co. The dissolution of the two companies is merely a matter of record in the office of the secretary of state of Illinois.

Peoria, Ill.—A proposition to install ornamental lights on the proposed park-to-park driveway on McClure avenue from Glen Oak park to Bradley park has been placed in the hands of H. J. Monahan, commissioner of public works of Peoria.

Taylorville, Ill.—The city council has approved the plans of the proposed municipal light and power plant, prepared by W. S. Merkle, consulting engineer, St. Louis.

West Bend, Wis.—Combustion Engineering Co., 11 Broadway, New York City, is preparing preliminary plans for the erection of a new electric power plant, 110 by 150 ft., for the West Bend Heat & Light Co.

Duluth, Minn.—Bids will soon be received by the city for the installation of a 15,000,000-gal. electric pump for the waterworks plant. Address Commissioner P. G. Phillips for further information.

Hibbing, Minn.—The city will install a new electric light system on First avenue South. Address J. P. Murphy, city clerk, for further information.

Independence, Minn.—The village

has voted to extend the power and light lines of the Wisconsin-Minnesota Light & Power Co. from Winona to Independence and supply 24-hour service.

Parkers' Prairie, Minn.—The Central Minnesota Rural Electric Co. has been organized to furnish light and power to farmers in the vicinity. H. L. Bailey, Little Falls, Minn., is the manager of the new company.

Willmar, Minn.—The city council will soon receive bids for the installation of a sewer sludge pump and a 5-hp. electric motor. Hans Gunderson is the city clerk of Willmar.

Kent, Ia.—An election will be held on Sept. 7 to vote on the question of issuing $5000 municipal light bonds. Address village clerk.

Maquoketa, Ia.—Brady Electric Co. has been awarded contract for the high tension line construction work on the lines of the Iowa Electric Co. extending east from Dewitt. Construction work will begin as soon as material is on the ground.

St. Joseph, Mo.—Plans are under way by the St. Joseph district of the Southwestern Bell Telephone Co. to install 3000 automatic telephones and make improvements to its two office buildings to make room for additional equipment. The total cost will be about $10,000.

Springfield, Mo.—Shannon County Copper Mining Co. is planning the erection of a hydroelectric power plant on Jack's Fork, near Eminence, Mo., for service at its mining properties and local community. L. O. Neider is manager.

Newman Grove, Neb.—The Nebraska Gas & Electric Co. will re-equip its plant and build new transmission lines.

Sioux Falls, S. D.—The city will make improvements and extensions in the electric light, water and sewer systems at an estimated cost of $175,000.

SOUTH CENTRAL STATES.

Oxford, Miss.—The city council is planning extensions and improvements in the municipal electric power plant for increased capacity.

De Witt, Ark.—The Arkansas Light & Power Co., Arkadelphia, is planning the installation of a lighting and power system here.

Little Rock, Ark.—The Arkansas Hydro Electric Co. approved plans of J. E. Sirrino, consulting engineer of Greenville, S. C., to proceed with construction of dam and power plant.

Piggott, Ark.—The Meyers Stave & Manufacturing Co. is planning the erection of a power plant in connection with the construction of a new factory. The entire project, including equipment, is estimated to cost about $300,000.

Springdale, Ark.—Goss & Early, of Fayettesville, have purchased the local electric light and power plant which they plan to remodel and improve.

Donna, Tex.—Donna Light, Ice & Power Co. has increased its capital to $75,000 for proposed extensions and improvements in its power plant.

Fort Worth, Tex.—Southwestern Power & Light Co. has arranged for a note issue of $2,000,000, the proceeds to be used in part for proposed extensions and betterments in electric plants and system.

WESTERN STATES.

Albion, Wash.—The city council has granted the Washington Water Power Co. a franchise to furnish electric light throughout the city.

Oakville, Wash.—Bonds to the amount of $20,000 have been voted to purchase the electric light plant owned by Frank Leisner.

Seattle, Wash.—The Puget Sound Power & Light Co. is stringing new circuits on 50 miles of transmission line between Seattle and Auburn, via Renton, the latter being an important switching station. The change, which applies to a double line between the points named, consists of replacing No. 00 aluminum conductors with 336,420-cir. mil. aluminum conductors with a conductivity equivalent to that of No. 0000 copper and of the standard stranding for conductors of that size. The pin-type insulators previously in service will be retained. The voltage of the line will remain at 50,000.

Los Angeles, Cal.—The city board is considering plans for union passenger terminal station, elimination of grade crossings and electrification of all roads leading out of Los Angeles. Address Richard Sachse, chief engineer, state railroad commission.

Los Angeles, Cal.—The Los Angeles Railway Co. plans the expenditure of $150,000 for improvements which include overhauling and replacing of three existing transformers at the Plaza substation, the installation of two new 15,000-kw. transformers and other equipment at Avenue 28 and Huron street.

CANADA.

Edmundston, B. C.—Plans are being prepared for the construction of a new pumping station to be operated with an electrically driven centrifugal pump, the entire improvement to cost $90,000. L. L. Theriault is the town manager of Edmundston.

Nanaimo, B. C.—The Nanaimo Electric Light Co. is to lay a 1-mile pipe line from a mountain reservoir to Milstone, where a new power house will be built.

Winnipeg, Man.—The civic power plant at Point du Bois sustained a loss of $25,000 by fire recently.

Regina, Sask.—By-law has been passed by the city council authorizing the expenditure of $50,000 on electric light plant. Address George Beach, city clerk.

Saskatoon, Sask.—City council has passed by-law authorizing extensions to electric light and power plant at a cost of $15,800. Address Andrew Leslie, city clerk.

INCORPORATIONS

Primghar, Ia.—Farmers' Electric Co. Capital $52,000. Simon Fjosern, president.

New York, N. Y.—Halliwell Electric Corp. Capital, $100,000. To manufacture electrical products and engage in electrical contracting. Incorporators: R. H. and E. A. Brown, and J. Jorgenson, 661 West 139th street.

New York, N. Y.—American Power Appliance Co. Capital, $500,000. To manufacture engines and electrical machinery. Incorporators: J. P. Brandenburg, G. A. Senior and F. C. Briggs, 68 Montague street, Brooklyn.

Jamestown, N. Y.—Chadokian Electric Co. Capital, $5000. To manufacture electrical specialties and engage in electrical contracting. Incorporators: C. H. Johnson, E. L. Hurley and A. J. Lawson.

Bernardsville, N. J.—A. K. W. Electric Co. Capital, $125,000. To manufacture electrical equipment. Incorporators: C. S. Amercan, C. E. Whitcomb and Harry J. Kessler.

Newark, N. J.—Reliable Electric Service, Inc. Capital, $50,000. To manufacture electrical appliances and equipment. Incorporators: Samuel Rauchwerk and Walter Weberbaur, Irvington, Newark.

Cleveland, O.—Commercial Electric Manufacturing Co. Capital, $250,000. To manufacture electrical specialties. Incorporators: W. W. Hale, N. G. Gray, R. W. Anderson, E. E. Costly and others.

Pottsville, Pa.—Anthracite Electric & Welding Co. Capital, $20,000. Incorporators: Martin L. Dunn and others.

Dallas, Tex.—Southwestern Battery Co. Capital stock, $20,000. To manufacture storage batteries and other electrical equipment. Incorporators: Albert Kramer, M. Rothman and F. B. Vonderhoya.

Wilmington, Del.—The Lyons Storage Battery Co. Capital, $500,000. To manufacture and install storage batteries, etc. Incorporators: T. L. Croteau, M. A. Bruce and A. M. Hooven.

FOREIGN TRADE.

[Addresses of firms referred to in these trade opportunities may be obtained by writing to the Bureau of Foreign and Domestic Commerce, Washington, D. C., or its branch and local co-operative offices. Request for each opportunity should be on a separate sheet and the file number given.]

Electrical Goods (33,462)—A firm of merchants and commission agents in India desires to secure agencies for the sale of electrical goods.

Electrical Flash Lights (33,463)—A hardware merchant firm in Mexico desires to purchase hardware, glassware, earthenware, paints, stationery, toys, woodenware, drugs, electric flash lights and batteries. Quotations should be given c. i. f. El Paso, Tex. Payment to be in cash. Correspondence may be in English.

Electrical Apparatus (33,387)—A company in Switzerland desires to secure an agency on a commission basis for the sale of machines for tool and precision instruments, as well as any other technical article, and chemicals, electrical apparatus, novelties, and emery grindstones. Quotations should be given c. i. f. Antwerp. Payment to be made in 30 days, upon receipt of the goods. Correspondence may be in English.

FINANCIAL NEWS

Comment on the Financial Outlook in the Electrical Industry, New Securities, Reports of Earnings, Dividends and Utility Stocks

Public Utility Financing Hurt by Income Tax.

That financing by big public utility corporations for the purposes of rehabilitation and improvements has been rendered almost impossible by reason of the federal income tax law is the plaint of many of the large companies. No longer can these corporations sell their securities to large investors except either at a prohibitive low price or an equally prohibitive interest yield. The chief reason for this is the income tax.

Large investments in public utility securities mean a heavy federal tax, whereas such investors now are turning to municipal bonds, which are tax exempt. Thus the public utility corporations must offer their securities at a price or with a yield that will assure an income after payment of federal taxes as great as municipal bonds now offer, which is between 5½ and 6%.

Some idea of why wealthy investors shun public utility bonds in favor of tax exempt municipal issues may be had from the following tabulation, which shows the yield on 5% corporation bonds when the investor's taxable income reaches certain amounts and the price at which the corporation must sell such bonds to assure the investor a yield of 5% after payment of federal taxes:

Taxable income.	5% utility bond will net.	Prices at which investor must buy to pay tax and net 5%.
$ 30,000	4.4	88.06
50,000	4.0	81.33
75,000	3.5	70.74
100,000	3.4	68.08
200,000	2.6	53.44
300,000	2.3	46.51

"Utility bonds have been hard hit by the federal income tax law," B. E. Sunny, president of the Chicago Telephone Co., said. "Many large holders of utility bonds have had their incomes so reduced that they are not now in the market for new issues, which adds greatly to the difficulty of the utility companies in getting new capital for extensions and additions."

In recent discussions of the financial situation of public utilities the point has been emphasized that these companies should have not only enough income to cover operating expenses and fixed charges, but also enough to insure a reasonable return on the investment, with something for a surplus account, to the end that their impaired credit may be restored and the way opened to getting new capital on reasonable terms.

When the Public Utilities Commission of Illinois permitted the People's Gas, Light & Coke Co. increased rates in June it went into this subject of reasonable return over and above operating costs and fixed expenses. A more recent and clearer case is the commission's decree granting rate increases to the Public Service Company of Northern Illinois. It is understood the increases will in effect amount to increasing the company's income approximately 25%, or something more than $2,000,000 a year. This increase, it is believed, insures income ample to meet operating expenses and fixed charges and the usual dividend requirements.

Stability of Utility Companies Proven by Severe Test.

In an address to the California Bankers' Association, Cyrus Peirce, of San Francisco, said:

"The financial history of the electric light company during the last four years or during the period of the war, has been very remarkable, and if there was any test of stability put to any business or any industry these public utilities certainly had one to face. Other businesses, other industries, begged the government for subsidies or a guarantee of profit. The public utilities industry did not. It asked for no government aid; it received no bonuses. It met tremendously increased demands upon it for power and heat, for gas, and for electrical energy to enable other industries to carry on their war operations; it met the demands and, as far as I know, there were no troubles and no receiverships, and it has been the same during the last 20 years. When deflation has been completed, it will not be necessary to carry on a campaign of instruction to convince anyone of the stability of public utility investment."

Standard Gas & Electric Co.'s Sinking Fund.

Standard Gas & Electric Co. deposited with Continental & Commercial Trust & Savings Bank, Chicago, trustee, $150,000 on Aug. 16, to redeem Standard Gas & Electric Co.'s 7% convertible sinking fund secured notes due Nov. 15, 1921.

Employes Participating in Company's Earnings.

Western Union Telegraph Co., New York City, is distributing about $2,000,000 among employes, arranged in line of their participation in the company's earnings for the first six months of the present year.

Nevada-California Electric Corp.

	1920.	1919.
June gross	$ 360,411	$ 316,015
Net after taxes	171,728	148,073
Total income	170,794	149,313
Surplus after charges	91,605	70,102
Six months' gross	1,502,831	1,231,456
Net after taxes	750,928	677,221
Total income	746,674	676,736
Surplus after charges	311,222	256,690

Bankers of the American Telephone & Telegraph Co. are considering new financing for the company, which it is reported will call for between $50,000,000 and $60,000,000 in new bonds.

Earnings of South Australian Electric Company.

The Adelaide Electric Supply Co., Ltd., a private corporation which furnishes the metropolitan district of Adelaide, South Australia, with electric light and power, earned a gross revenue for the year ended Aug. 31, 1918, of £174,254 ($848,007), as compared with £154,451 ($751,636) for the previous fiscal year. A dividend of 12% was paid in both years.

Kansas Gas & Electric Co.

	1920.	1919.
June gross	$ 248,225	$ 179,295
Net after taxes	39,164	49,453
Total income	39,826	49,474
Surplus after charges	*7,101	10,418
Twelve months' gross	3,010,470	2,407,806
Net after taxes	801,249	755,254
Total income	805,777	773,729
Surplus after charges	277,369	324,424
Balance after preferred dividends	118,188	190,455

*Deficit.

Pacific Power & Light Co.

	1920.	1919.
June gross	$ 212,240	$ 180,997
Net after taxes	96,537	95,566
Total income	97,163	96,189
Surplus after charges	52,402	50,323
Twelve months gross	2,398,481	1,975,710
Net after taxes	1,113,210	910,573
Total income	1,122,161	920,370
Surplus after charges	591,502	381,688
Balance after preferred dividends	400,208	192,688

Standard Gas & Electric Co. and Subsidiaries.

	1920.	1919.
June gross	$2,395,536	$1,961,564
Net after taxes	828,992	728,492
Twelve months' gross	29,478,902	25,630,028
Net after taxes	10,858,479	9,480,961

WEEKLY COMPARISONS OF CLOSING-BID PRICES OF SECURITIES OF LEADING ELECTRICAL COMPANIES.

Quotations furnished by F. M. Zeiler Co., Rookery Bldg., Chicago.

Public Utilities—	Div. rate Per cent.	Bid Aug. 17.	Bid Aug. 24
Adirondack Electric Power of Glens Falls, common	6	14	14
Adirondack Electric Power of Glens Falls, preferred	6	70	72
American Gas & Electric of New York, common	10+extra	95	95
American Gas & Electric of New York, preferred	6	33	34
American Light & Traction of New York, common	..	110	110
American Light & Traction of New York, preferred	6	81	81
American Power & Light of New York, common	4	44	45
American Power & Light of New York, preferred	6	65	67
American Public Utilities of Grand Rapids, common	..	..	3
American Public Utilities of Grand Rapids, preferred	7	..	11
American Telephone & Telegraph of New York	..	96⅛	98
American Water Works & Elec. of New York, common	..	1	2
American Water Works & Elec. of New York, particip.	7	3	5
American Water Works & Elec. of New York, 1st preferred	..	36	37
Appalachian Power, common	..	1	1
Appalachian Power, preferred	7	15	15
Cities Service of New York, common	+extra	274	292
Cities Service of New York, preferred	6	65	66
Commonwealth Edison of Chicago	8	101	102
Comm. Power, Railway & Light of Jackson, common	..	17	16
Comm. Power, Railway & Light of Jackson, preferred	6	34	36
Federal Light & Traction of New York, common	..	7	7
Federal Light & Traction of New York, preferred	..	40	40
Northern States Power of Chicago, common	..	29	29
Northern States Power of Chicago, preferred	ex.div.7	74	74
Pacific Gas & Electric of San Francisco, common	..	46	46
Public Service of Northern Illinois, Chicago, common	7	65	66
Public Service of Northern Illinois, Chicago, preferred	6	83	84
Standard Gas & Electric of Chicago, common	..	12	12
Standard Gas & Electric of Chicago, preferred	6	35	35
Tennessee Railway, Light & Power of Chattanooga, com.	..	½	1
Tennessee Railway, Light & Power of Chattanooga, pfd.	6	2	2½
Western Power of San Francisco, common	..	16	18
Western Union Telegraph of New York	extra.	..	84
Industrials—			
Electric Storage Battery of Philadelphia, common	4	94	96
General Electric of Schenectady	8	139⅛	141
Westinghouse Electric & Mfg. of Pittsburgh, common	7	47	47